

» **Handmade metal monster truck!** p.218

VOTE & WIN!

READERS' CHOICE
AWARDS

P. 171

RADIO CONTROL

car action

THE WORLD'S BEST-SELLING RC CAR MAGAZINE



EXPOSED!

INSIDE TEAM LOSI'S
TOP-SECRET
MONSTER

p.72

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APRIL 2004

**TESTED > TEAM LOSI TRIPLE-X BK2 > TAMIYA TA04-TRF
YOKOMO MR-4BG SPECIAL > TRINITY REFLEX 12**



RADIO CONTROL car action

VOLUME 19 ■ NUMBER 4 ■ APRIL 2004

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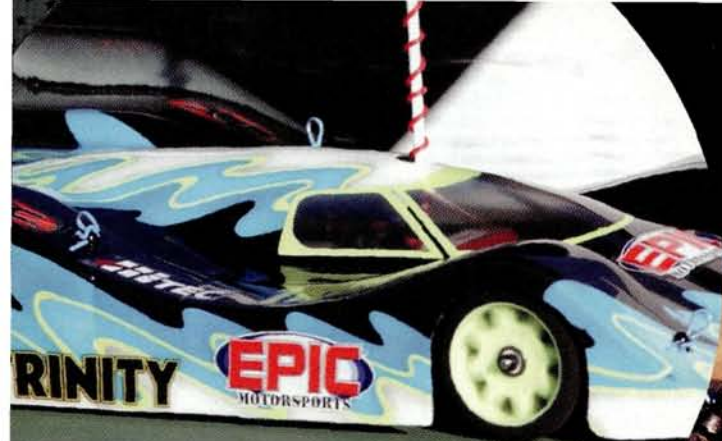
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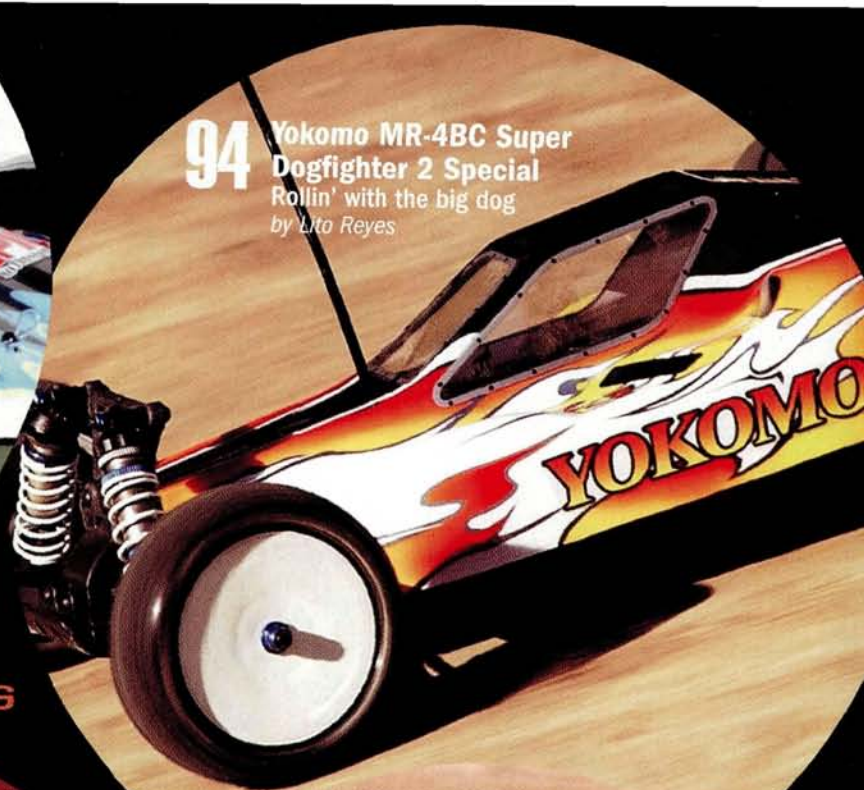


COVER STAR: Yep, that's Team Losi's new monster truck tearing up Revelation Raceway. It's so new that Losi doesn't even have a name for it yet!

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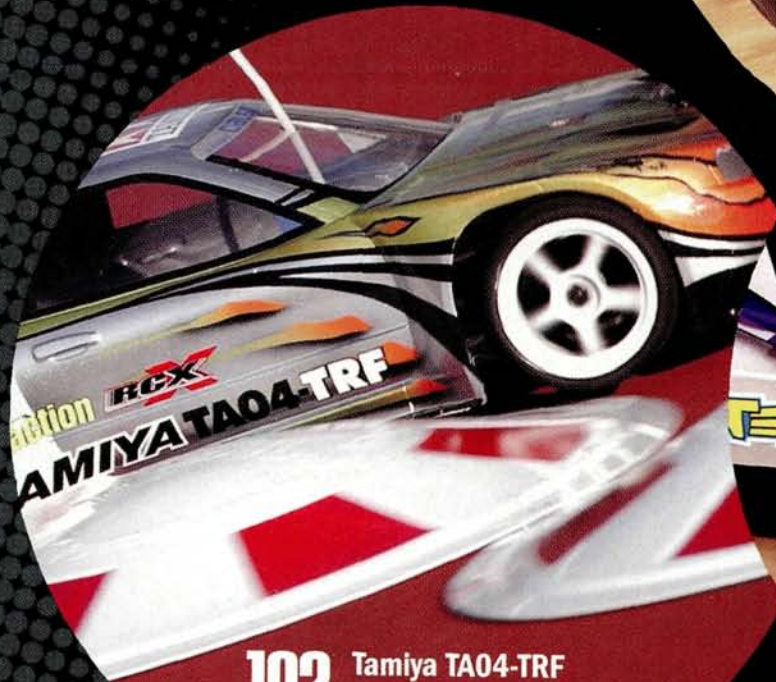


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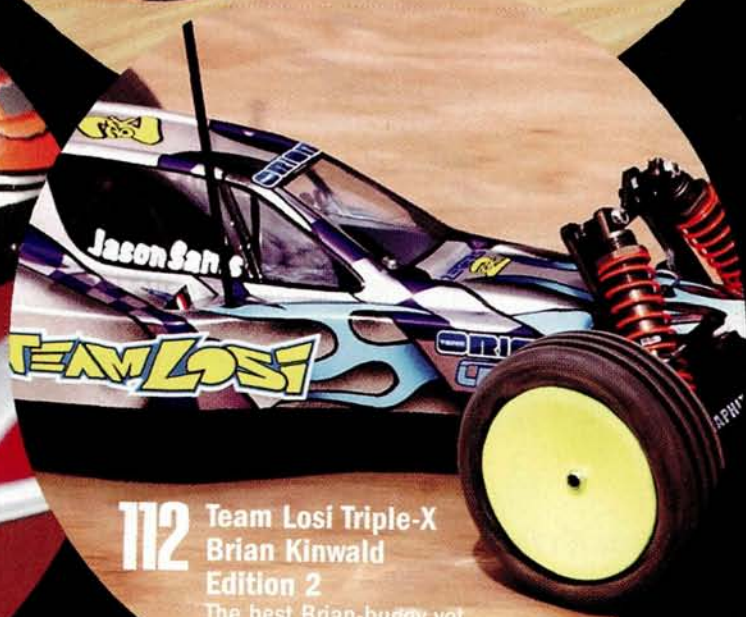


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starting line

Your vote counts!

Every year, the April issue of *RC Car Action* has a little something extra: the "Readers' Choice Awards" ballot. It's a big deal! Do you think that the many RC manufacturers take note when the readers of "the world's best-selling RC car magazine" make their picks for their favorite products of the year? You bet they do! So don't miss your chance to be heard. You'll find the official ballot on page 171, and there's a category for every type of radio-control vehicle and product: nitro and electric, on-road and off, motors, batteries, fuel, engines—they're all in there (some of last year's winners are pictured here). Voting is easy; send your ballot in by mail, or just click over to rccaraction.com to vote online. Just be sure to get your vote in by April 5! While you're voting, keep the following in mind:

■ Vote for the stuff you like best, for whatever reasons are important to you. You might vote for something because it's a great value, or because it's expensive and exotic and you dream about winning the lottery to buy it. Or maybe you have another reason for your choice. The reason doesn't matter, it's your choice.

■ Make sure that you include the manufacturer and name of each product. If your favorite electric truck is the Tamiya Twin Detonator, and you only write "Tamiya," we'll have no way of knowing which Tamiya truck you wanted to vote for, and that vote won't count.

■ When choosing a vehicle for the "on-road/touring" categories, remember that you can vote for any "not off-road" car. You don't have to choose a touring car! If you're into 1/12 scale, oval, Mini-Zs, etc., this is your chance to vote 'em in as your favorite.

■ One ballot per person. We toss out duplicate ballots, and the online voting system automatically kicks out duplicates, so don't bother trying to stuff the ballot box!

Here's the best part: you might win something! We'll pick one ballot at random as our prizewinner; if it's yours, you can claim any "Readers' Choice" winning vehicle as your prize!

IN THIS ISSUE

LOSI DROPS THE BIG ONE

You probably already flipped to this article while you were waiting in line at the register! That is indeed the as-yet-unnamed Team Losi monster truck on our cover, and it just might be the best nitro monster ever. It's certainly the most original machine of the post-T-Maxx period!

DUAL "DYNO TESTS"!

We have two big motor reviews this month: Team Orion's revolutionary V2 modified and Trinity's new D6 powerhouse. As usual, we've got all the specs and performance data you can handle!

HOLESHOT IN A BOX

The factory pro's will have one less trick to use against you after you've built your own bump box to blast your batteries. We show you how, step by step.

FAST FOUR

Electric racers, you're in luck: all of this month's "Track Test" machines are battery-carrying, competition thoroughbreds. With the Team Losi Kinwald Edition 2, Trinity Reflex 12, Yokomo MR-4BC Special 2 and Tamiya TA04-TRF in the mix, there's gotta be a ticket to the winners' circle in there!

Until next month,

Peter Vieira

Peter Vieira, Executive Editor



RADIO CONTROL car action

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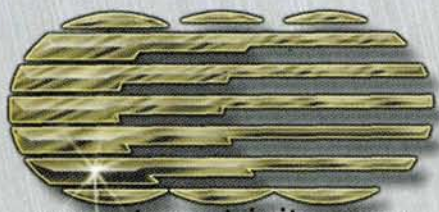
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WHY PULL-START?

Why does the OFNA Hyper 7 PCR include a pull-starter? Since it comes with a starter box, OFNA could have left the pull starter off to get more power from the engine. [email]

Paul Marr

Actually, pull-starters rob the engine of only a very negligible amount of power. We once radar-tested an RC10GT with a pull-start O.S. CV engine and then removed the pull-starter and retested it. There was no change in the acceleration or top-speed data. If the difference isn't enough to show up on the charts, then it isn't enough for me to care about! Especially in a big-block, 8-port engine like the Hyper, you'll never feel a difference. And look at the bright side: if you forget to charge up the starter-box batteries, you'll still be able to fire up your buggy.

—Pete

FOUR-WHEELIN'

Hey guys, awesome mag. I haven't learned more about anything else in such a short time than what I've learned about RC from your mag. I wonder whether there's a national 4WD stadium-truck racing class? Playing off that, what do you guys think of the RS4 MT2? I'm looking for something that could be fun to bash around but is also fast on the track. I'm also quite an HPI fan, so I'd like to drop my precious dollars (I don't have a lot of spare cash) on a company I believe in. [email]

Matt

Actually, ROAR does include a provision for 4WD trucks in the "1/10-scale Fuel Truck" class rules. The rules for 2WD and 4WD trucks are the same, except for minimum weight: 2WD trucks must weigh at least 60 ounces, but 4WD trucks can weigh 64 ounces. Unfortunately, it's rare to see the class actually

run in a sanctioned racing event, which is a real bummer, since the trucks are a blast to drive, especially on a track. As for the MT2, it's just about the best four-wheeler out there. Look for a review soon.

—Pete



HONORABLE DISCHARGE

I have a DuraTrax IntelliPeak charger (reviewed in the January issue), and I'm happy with it. I have a question about the cutoff voltage on the discharge cycle. Every article I've read recommends discharging NiMH batteries to no lower than 0.9 volt per cell or 5.4 volts for a 6-cell stick, yet both of these chargers have a much lower cutoff. What gives?

Ray Davis
Atlanta, GA

I looked up the charger's specs on the Tower Hobbies website, and you're right: the discharger cuts out at 2.6 volts, which is 0.43 volt per cell. Tower's "Tech Notes" go on to say that the cutoff is fixed, so if you want to stop discharging at a higher voltage, you should monitor the pack with a digital voltmeter or just use the IntelliPeak's voltage display. Since the experts say 0.9 volt per cell is best, I'd heed their advice instead of relying on the built-in voltage cutoff.

—Pete

BIG ON MINIS

About a year ago, someone wrote that no companies make a mini Maxx. Now, a year later, companies are answering the call—or at least, they have the technology to do it. With Mini-Zs, the Mini-T, the Mini-Z Monster and the Tamiya TLT-1 you can have a miniature world! That's pretty cool in my opinion, but since everything



is getting smaller, it needs to stop sooner or later, or we won't be able to see the stuff! It must be cool for you guys to test these minuscule wonders. [email]

Drummond Buchenroth

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readerswrite

We're on it. We already tested the Mini-Z Monster (last issue) and Mini-T (February issue) and our TLT-1 just arrived! Now, let me end my reply before I'm no longer able to resist making a "Different Strokes" joke, Mr. Drummond.

—Pete

BUILD IT, AND THEY WILL COME

If I had any manufacturing connections, I'd go into business with this idea myself, but I don't, so I'm hoping you guys can throw it out to the RC industry for me. What the RC world needs is a completely rebuildable, high-quality glow starter. I've tried the cheap ones, and I've tried the good ones, but they all go bad sooner or later. I'd be happy to pay more for a glow starter with a replaceable center contact, positive clamp/release mechanism, accurate power meter and heavy-duty construction. The option of an included quick-charger would be great, too. Anybody out there listening? [email]

Bill Wyatt

Well, anyone? Put me and Bill on the waiting list for a high-quality, rebuildable glow starter.

—Pete

TWO-SPEED ELECTRIC?

I would really like to get a fast car, but I don't want the hassles of a nitro vehicle. Most nitro cars only go about 10 to 20mph faster than electrics because they have 2-speed transmissions. Why don't the RC manufacturers put a 2-speed in electric cars?

Kyle Horcher

Fox Lake, IL

Nitro cars can benefit from a 2-speed because piston engines generate maximum power at high rpm. The 2-speed is there to provide an "easier" first gear, so the car can accelerate more quickly. The transmission doesn't really increase top speed, it just decreases the time required to reach top speed. Electric motors, on the other hand, develop maximum power at low rpm and don't need an "easy" first gear to accelerate well. At high rpm, an electric motor doesn't have the power to exploit an upshift to a lower gear ratio. Two-speed trannies aren't often seen in electric vehicles simply because the minor potential for performance gain is usually outweighed by the cost and complexity of a 2-speed system.

—Pete

YOU SAID IT

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"I'm glad I'm not sponsored"

I was just staying up late and cruising around the bulletin boards and thought it would be cool to email you. I read posts about how to get sponsored and what it means to be sponsored, and I'm actually glad I'm not sponsored. I'm really looking forward to racing this weekend because I haven't gone in two weeks. I could have gone, but I just didn't feel like it. If I were sponsored, I doubt "I don't feel like racing" would be an option. That wouldn't be much fun, and I would be sad if RC wasn't fun for me anymore. Well, that's enough. I was hoping that writing this would make me sleepy, and it did. See ya. [email]

Brian Westmore



Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is the Reference Stratus-Y body.

Yep, it isn't all free stuff and trophy girls. If you want to get sponsored and stay sponsored, it's a lot of work—just like being a professional in any sport or game. If that's your dream and you've got what it takes, then go for it. But it isn't a dream for everyone!

—Pete



TWIN-MOTOR MONSTER

KYOSHO TWIN FORCE 4WD electric monster truck

Kyosho's new Twin Force electric monster looks like it's going to be a blast! The truck is based on the popular Mad Force nitro-powered monster, but instead of a .21, the Twin Force is powered by two 550 motors and two 6-cell battery packs (mounted alongside the main chassis rails). The truck even comes with a slick radio box that's designed to keep dirt and debris away from the receiver and ESC. Stay tuned; we'll have a full review next month. Kyosho; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; kyosho.com.



SPYSHOT



a storm in the making

GS RACING Avenger storm Mk. II

GS Racing is set to release an all-new 1/8-scale buggy. All I've seen of the buggy, which goes by the name Avenger Storm Mk. II, are preliminary CAD drawings. It looks as if it has all the usual racing features, including laydown servos. As soon as I get more information, I'll pass it along.

GS Racing; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com; gsracing.com.tw.

SERIOUS SIRIOS

Sirio new .12 small-blocks

Sirio has a few new engines: two 5-port .12s (one with an SG shaft, the other with a threaded shaft) and a 3-port .12. These EVO 2 engines feature ABC construction and slide carbs; the 5-port versions come with turbo plugs, and the 3-port comes with a standard plug. Power output for the 5-port is 1.6hp @ 43,000rpm, and the 3-port pumps out 1.5hp @ 41,000rpm, according to Trinity. Sirio; distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com.





we're getting all x-cited

parma x-citer mini-t body

Parma is the first to produce an aftermarket body for the popular Team Losi Mini-T. The new X-Citer body is made of 0.030-inch clear Lexan and includes window masks and overspray film protection to make it easier to paint. It also comes with full body graphics, so it only needs a one-color paint job to give it a custom look.

Parma/PSE (440) 237-8650; parmapse.com.

BOX STOCK



Trinity stock racer starter kit

This is a great idea! Trinity has come up with a complete Stock Racer Starter Kit that includes all the essentials to get you on the track: a Monster stock motor; a Zip Pack (1500mAh); a Micro Oiler; motor screws; motor springs; motor brushes; a comm-cleaning pen; and Buggy Blast cleaning spray. The kit saves you more than \$10 off the cost of purchasing all the items separately, and you get a cool plastic carrying case that is, no doubt, worth a few extra bucks, too!

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



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NITRO BEER WAGON

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Protoform speed 12 GTP Body

Protoform's new Speed 12 GTP body is based on the LeMans-winning Bentley. It's low and sleek, and according to Protoform, its unique spill plates (the vanes between the side dams) provide stable handling and balance. The Speed 12 is available in lightweight 0.020 Lexan and comes with protective film to aid in the paint process. A highly adjustable Gurney flap is included to add rear down-force where conditions require it, and it meets BRCA, ROAR and IFMAR specs.

Protoform Inc.; distributed by Pro-Line (909) 849-9781; pro-lineracing.com.



Go Speed Racer!

Bulletproof YOUR BK2

Trinity Team Losi BK2 parts

Trinity has a new selection of Team Losi BK2 buggy parts. They include: rear-wheel spacers that provide additional support for the rear wheels to prevent them from deflecting or bending; a billet-aluminum, front hinge-pin brace with a built-in swaybar mount; and a blue, graphite battery brace/strap with a greater surface area that will help keep the batteries in place under any condition. Prototype suspension parts are shown; the production pieces will be blue-anodized aluminum.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



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Now Blended For Monster Trucks

J-concepts BJ4

This prototype 4WD was designed by factory drivers Jason Ruona and Brad Reelfs only two weeks before the IFMAR Worlds at Minnreg, FL, and it placed an amazing 13th overall! The car is an Associated hybrid; more specifically, it blends the B4 buggy suspension with the TC3 touring car's drive train. Add a custom chassis and shock towers, and you have the making for a trick "works" car. We hope to give you an in-depth look at this unique car when a production sample is available.

J-Concepts Inc.
(352) 243-5904; jconcepts.net.



MUCHO MINI-T MODS

Team Losi mini-T hop-ups

Team Losi's new Mini-T is one of the hottest things on four wheels. It was only a matter of time before the hop-ups started pouring in, and I've had the first look at what Losi has to offer for its pint-size pickup.



BODIES Two new bodies are available: a Mini-150 for Ford fans and a Mini-CK body for Chevy fans. Both bodies come complete with detailed sticker sheets and precut window masks.

FLUID-FILLED SHOCKS These little shocks feature the race-proven shock technology that's used on Losi's 1/10-scale models. The shock bodies are hard-coated, and they come with titanium-nitride shafts. Each set includes either two front or two rear shocks that come assembled with springs and are ready for the fluid of your choice. In addition, the set comes complete with mounting hardware, an assortment of preload shims and two optional pistons. Replacement parts and front and rear spring sets are available separately.



TITANIUM These titanium turnbuckles are just like the precision-machined left/right threaded turnbuckles used on Losi's larger racing vehicles. The lightweight turnbuckles allow quick and easy adjustments and are used with the stock ball cups. They're available in a complete set with an adjusting wrench or in pairs by size.



TIRES Team Losi offers four tires: Mini Step-Pin, Mini Smasher, Mini Street Meats and a foam tire. All the tires (except for the foam) include precision-cut foam liners and come glued on Mini-T yellow or chrome rims. The foam tires are securely glued on precision-molded wheels and are then ground and trued.



BATTERIES These new 5- and 6-cell battery packs give a dramatic increase in both speed and acceleration, all while providing decent run times (15 to 30 minutes, depending on the pack you pick). Losi also offers a simple, wall-type AC quick-charger that can charge either of the packs in a couple of hours. It also offers an adapter if you already have a charger that can charge NiMH cells. You can also buy a combo that includes the 6-cell pack and the charger.

Team Losi; distributed by Horizon Hobby Inc.
(800) 338-4639;
teamlosi.com;
horizonhobby.com.



Pro-Line Racing Ford F-150 body for the Team Associated T4

Pro-Line has a brand new body for the T4: the all-new 2004 Ford F-150. Its race-inspired body has a super-low-profile finish that maintains the true F-150 look. The body is made of durable 0.030-inch-thick Lexan, and it includes a decal sheet, window masks, a rear spoiler and mounting hardware. Pro-Line (909) 849-9781; pro-lineracing.com.

Fast & Furious Ford

stylin' slot cars

Ninco slot cars

MRC recently announced that it's the exclusive distributor of the Ninco slot-car line. Normally, I wouldn't give slot cars a second thought, but even diehard RC'ers have to admit that these things are pretty trick! Ninco is the first slot-car company to offer off-



road cars with adjustable suspension, and it has a unique selection of off-road tracks. Whatever your taste in cars may be, Ninco probably has a set for you—from rally, off-road, classic cars, F1 and DTM (touring car), to go-karts and more. Track sets are available from the most basic to the all-inclusive that even include computerized lap counters. Extension sets that can take your layout to even bigger proportions are also available.

Ninco; distributed by Model

Rectifier Corp. (732) 225-2100; modelrectifier.com.



Slick stands

Tamiya Motor & shock stands

These two new stands are as beautiful as they are functional (can you tell we love Tamiya tools here at RC Car Action?). The new, solid-aluminum motor stand can be used for motor maintenance and when breaking in a new motor; it's extremely stable and helps dissipate heat. The shock stand is a stout piece that weighs in at 230 grams. It, too, is made out of solid aluminum and can hold up to nine screwdrivers and wrenches as well as four shocks.

Tamiya America Inc. (800) 826-4922; tamiyausa.com. ■



MINI MIGHT

XRAY M18 Power pack

This must be the new age of RC "value meals." XRAY now offers this cool combo pack for its 1/18-scale M18 Mini. Included in the combo are a microservo, a stock motor, a 5-cell battery pack and a micro speed controller.

XRAY; distributed by Serpent USA (305) 639-9665; teamxray.com.



JASON SANTANDER, MOUNTAIN VIEW, CA CUSTOM NITRO PICKUP

There is a lot to be said for creating your own nitro pickup truck and Jason did just that. It has a custom-built aluminum chassis and an OFNA Force 21 engine; a drive train transplanted from a 1/8-scale buggy has been set up for rear-wheel drive; a four-link suspension system (made of T-Maxx turnbuckles) and an Airtronics radio. The super-realistic ABS plastic Ford F150 body with complete interior was salvaged from a toy, and the overall imagination and ingenuity that's shown in this creation makes it our Reader's Ride of the Month.

JOE ABDILLA, PERTH, TASMANIA, AUSTRALIA KYOSHO PURE 10GP

It's cool to know that you can go almost anywhere in the world and find someone involved in RC. Joe sent in a picture of his Kyosho Pure 10GP all the way from Down Under. He added a bunch of hop-ups, including a tuned pipe, an O.S. slide carb and a 2-speed tranny. He controls his Viper with a Hitec Lynx radio.



WIN A ONE-YEAR SUBSCRIPTION TO RC CAR ACTION MAGAZINE! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to RC Car Action and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. If you'd like to send photos by email, submit your 300dpi TIFF or JPEG images to readersrides@airage.com.

TOM SCHENKEL, MONTICELLO, WI ASSOCIATED RC10GT

Here is a picture of Tom's most recent addition to his RC lineup: an RC10GT. He set up his truck with after-market goodies from O.S., Novak, Hitec and Pro-Line. His friend Jason, who has clearly honed his airbrushing skills, painted the sweet-looking body.



DERRICK BARTON, VIRGINIA BEACH, VA TRAXXAS T-MAXX 2.5

Derrick sent us a bunch of pictures of his RC cars, but his T-Maxx stands out from the bunch. The chassis features a slew of after-market parts, including aluminum parts from Traxxas, Hardcore and Dynamite, an RB Innovations supercharger, a Robinson Racing brake kit and vented flywheel, an MIP onboard fuel gauge, and the list goes on. To complete his truck, Derrick used a Pro-Line Hummer H2 body and mounted Pro-Line Road Rage tires on Hardcore Vortex aluminum wheels.



STEVE BUCHANAN, WEST PALM BEACH, FL
TRAXXAS E-MAXX

With its Imex Jumbo Kong tires, Steve's E-Maxx has enough buoyancy to easily cruise around his swimming pool. And on land, the truck has no problems surviving harsh terrain thanks to its Bomb-proof Products extended chassis, MIP CVDs, Robinson Racing slipper clutch, Pro-Line steering kit and Traxxas Big Bore shocks and skidplates. The Bronco body is from HPI.

DWAINE PRUITT
KANSAS CITY, MO

TRAXXAS STAMPEDE

Dwaine couldn't resist modifying his Traxxas Stampede into the "Monster Mutant" shown here. The transformation all started when he came up with a way to install T-Maxx wheels on his Stampede, and the rest fell into place. He designed and made the bumpers, mounts, headlights, side-view mirrors, and he used a Parma '34 Ford pickup body. The stock Stampede didn't have enough power for his liking, so he dropped in a Novak brushless motor system. Dwaine tells us that the truck really rips now!



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Reedy Quasar AC/DC Battery Charger. Reedy's economical #610 "Quasar" peak-detecting charger plugs right into the wall (or works from any 12V power source) and adjusts from .5 amps to 6.5 amps to charge Ni-CD, Ni-MH or receiver packs.

#610 Reedy Quasar AC/DC Charger

Reedy Tire Warmers. Be ready for racing from the very first lap! Reedy Tire Warmers work from your 6-cell battery pack to pre-heat your touring car's rubber tires to race temperature.

#608 Reedy Tire Warmers



REEDY



NICOLAS DEMAEGD
MISHAWAKA, IN
TEAM LOSI TRIPLE-X
MATT FRANCIS EDITION

Nicolas races his Triple-XT with a Novak Super Rooster ESC, a JR radio system and a Trinity modified motor. He says he is relatively new to RC but is already hooked. When he is not racing, Nicolas is out off-road bashing with his Traxxas E-Maxx.



MIKE WASLEWSKI, ORLAND PARK, IL
TRAXXAS T-MAXX 2.5

Mike took his time building up this nice-looking T-Maxx to be the truck of his dreams. The Cadillac Escalade body with painted flames is from Pro-Line. Beneath the flatbed, he mounted a Traxxas racing pipe, a Motor Saver air filter, a New Era wheelie bar, Megatech bumpers, Team Losi shocks and Pro-Line wheels and tires.



Reedy Ni-MH Receiver Packs for Nitro Cars and Trucks. Reedy receiver packs give you the long-lasting, reliable power needed for nitro racing, and have a great low price that makes them your **BEST** choice!

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CHASSIS MARKUP

On most nitro vehicles, you have to reset the gear mesh whenever you reinstall the engine. If you thoroughly clean your vehicle after every day of running, you'll have to set the gear mesh quite often. If you know your gear mesh is perfect, before you remove your engine, scratch lines on the bottom of the chassis plate to show exactly where the engine-mount screw heads are. Next, fill these scratch marks with a bright paint, and wipe off the excess. Now, you'll be able to quickly reinstall your engine with confidence, knowing that your gear mesh will be perfect.

Stephen Carter
Kissimmee, FL



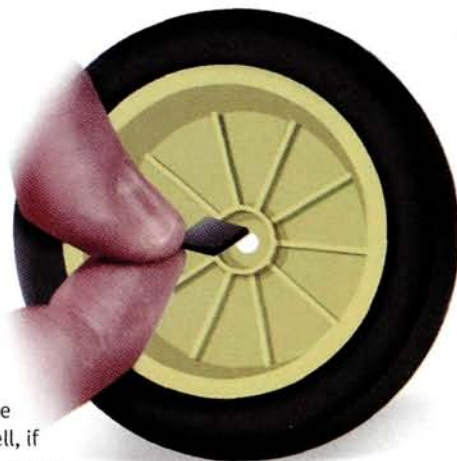
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LOSI HEX FAST FIX

The hex-shape depressions on the Losi Triple-X4's rims are pretty shallow. Although the design works well, if your wheel nut loosens slightly, the hex shape in the rim will get rounded out if it slips on the thin, aluminum drive hex. But you'll still be able to make your next race by using just a small square piece of servo tape. Cut the tape to fit inside the rim's hex shape, and then make a small hole with the tip of a hobby knife for the axle to pass through. Attach the rim as usual, and make sure that the wheel nut is completely secured. This fix isn't permanent, but it will get you through a race day.

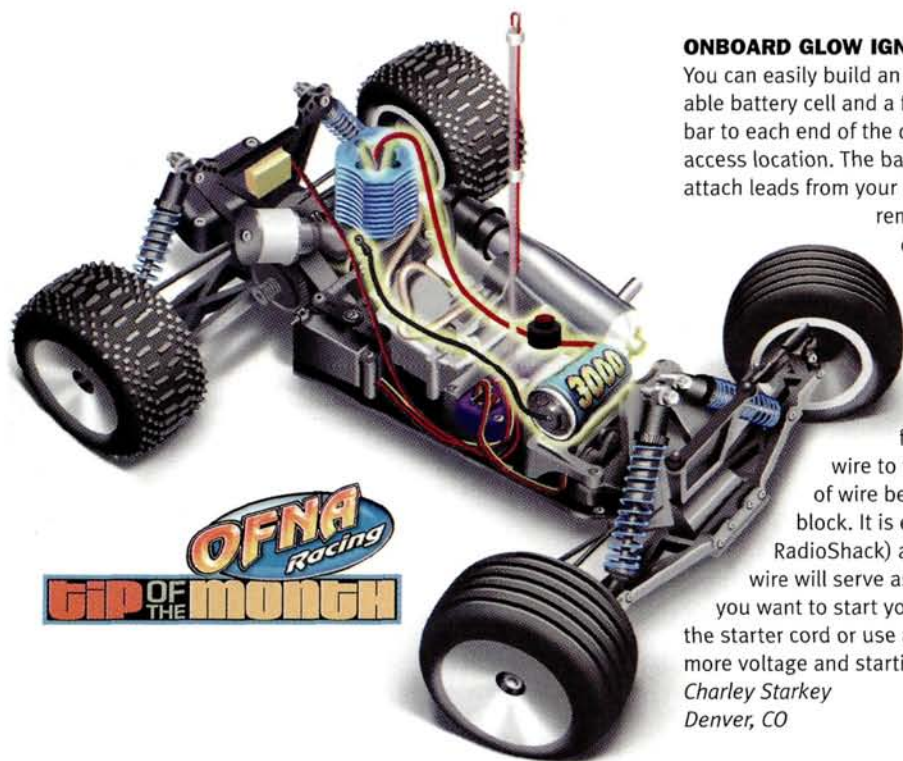
Tom Springer
Pontiac, IL



ONBOARD GLOW IGNITER

You can easily build an onboard glow igniter using a single sub-C rechargeable battery cell and a few simple, inexpensive parts. First, solder a battery bar to each end of the cell, and strap the cell to the chassis in an easy-to-access location. The battery bars will give you a spot to which you can attach leads from your charger, so you'll be able to recharge the cell without removing it. The next step requires a section of wire, a crimp connector and a small, two-prong, momentary pushbutton switch from RadioShack. Select a crimp connector that fits snugly over the electrode end of your glow plug but can also be pulled off when required. Crimp one end of the wire onto the connector, and solder the other end to one prong of the switch. Solder another length of wire from the other prong, and attach the other end of the wire to the positive end of your cell. Finally, solder a length of wire between the cell's negative terminal and the engine block. It is easiest to use an eyelet connector (also from RadioShack) and attach it to any steel screw on the engine. This wire will serve as a ground and will complete the circuit. Now, when you want to start your engine, just hold down the switch while you pull the starter cord or use a starter box. You can even wire 2 cells in series for more voltage and starting power.

Charley Starkey
Denver, CO



GLITCH LESS

Radio glitches are frustrating. If you've checked all of the radio components and you still have problems, try twisting the negative and positive wires that travel from the ESC to the motor around each other. Both wires produce electrical noise that causes interference, but if you twist them together, each cancels out the glitch-causing effect of the other to reduce or even eliminate the problematic noise.

*James Gibson
Chicopee, MA*



SHINY SHOCK SHAFTS

If the shock shafts on your car or truck are scratched, you can polish, or buff, out the scratches with a Scotch-Brite pad. A worn shock shaft can damage the O-ring seals in the shock; they'll then leak, and your vehicle's handling will suffer. A Scotch-Brite pad will remove most scratches and will buy you some time until you're able to pick up shiny new shafts.

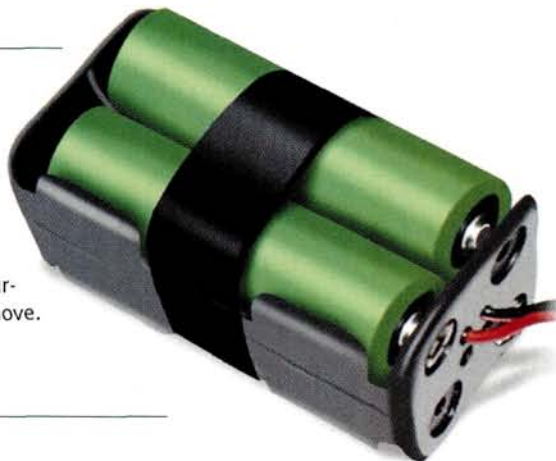
*Ben Douglas
Meriden, CT*



RECEIVER PACK STRAP

The 4-cell receiver battery-pack holders that often come with nitro kits work fine, but AA cells can pop out of the holder during hard running. If a cell pops loose, it can cause a loss of signal. To prevent this, wrap electrical tape around the battery pack. The tape will hold the pack securely in place even during the hardest driving, but it will still be easy to remove.

*Keith Quill
Buffalo, NY*



SLICK CUT

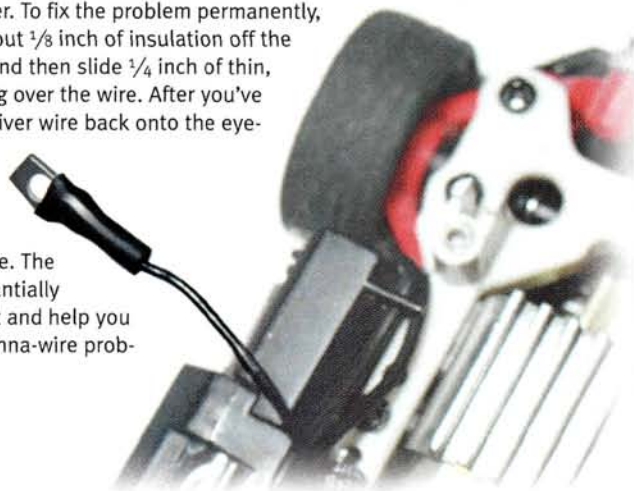
Cutting servo tape with regular scissors or a hobby knife can be difficult. No matter how sharp the scissors or knife, the tape always seems to stick to the blades. The solution to this is a pair of Teflon-coated scissors. These cutting tools can often be found in the fishing department or craft section of department stores. The tape doesn't stick to the slick Teflon coating, and that makes cutting servo tape becomes much easier.

*Bob Hull
Grafton, WV*

MODIFIED XMODS ANTENNA

RadioShack XMODS' antenna wires are susceptible to being broken with frequent wrenching. The break is usually where the antenna wire coming from the receiver is soldered to the eyelet that's connected to the piano-wire antenna extension. The wire is easy enough to solder back on, but you may have to do it over and over. To fix the problem permanently, carefully strip about 1/8 inch of insulation off the end of the wire, and then slide 1/4 inch of thin, heat-shrink tubing over the wire. After you've soldered the receiver wire back onto the eyelet, slide the heat-shrink tubing over the junction, and shrink it into place. The tubing will substantially reinforce the joint and help you avoid future antenna-wire problems.

*Matt Asplund
Clemson, SC*



"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips." Readers are strongly encouraged to check their equipment's warranty before they perform any modifications.

Troubleshooting

YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

BY PETER VIEIRA

NEED HELP? Send your "Troubleshooting" questions and comments to troubleshooting@airage.com, or mail them to "Troubleshooting" c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

Q FUEL-FLOW FLUB

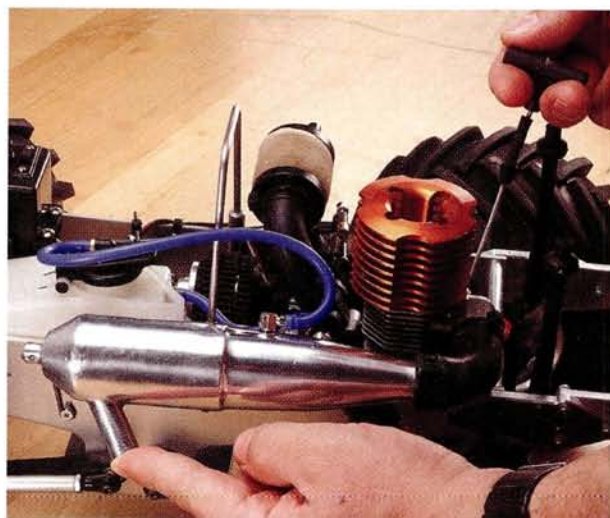
I recently purchased a DuraTrax Nitro Evader ST and am having trouble with the fuel going back up the fuel line and getting into the exhaust. Is this normal? When this happens, it takes an awful long time to start. Once it starts, it runs well, and it starts straight away when it's warm.

Grant Arthur



If fuel won't flow into the fuel line, check the tank's internal filter, the fuel line, any external filters and the carb inlet—something's clogged.

A Hmm. I'd say that you have a clogged fuel line, and the pressurized fuel has no place to go except back into the pressure line. But you say the truck runs fine once started; that rules out the clogged carburetor/fuel-line theory. Are you over-filling the tank? If the fuel is right up against the tank's "ceiling," that could be part of the problem. When starting the truck cold, plug the exhaust stinger with your finger. This will prevent the exhaust pressure from escaping through the stinger instead of pressurizing the tank. When you see fuel reach the carb, take your finger off the stinger; the engine should fire right up.



Plug the stinger with your finger to prevent exhaust pressure from escaping as you prime the engine.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft

NEW



This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit

NEW



This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear

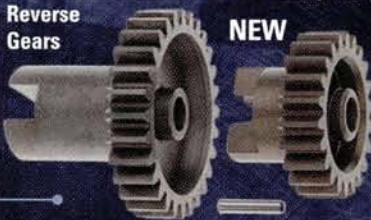
NEW



Precision machined from solid steel and then **hardened**. RRP 8529. **Hardened** aluminum version RRP 8528.

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears

NEW



This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

T-Maxx/2.5-Maxx Primary Reverse Gear

NEW



This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and 2 Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8186 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx. RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro. RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro. RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx. Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

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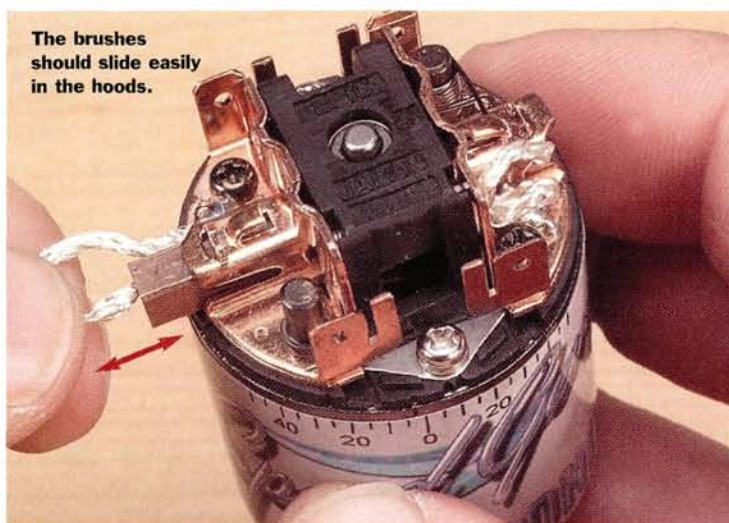
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Q HUNG BRUSH

I have a DuraTrax Evader ST and am having a problem with it. Every time I go out to drive it, the motor won't start to turn until I give it a push. It's as if my Photon Speed motor needs a push start. I was wondering whether you might know what the problem might be and what I should do. [email]

Iggy Strbac



The brushes should slide easily in the hoods.



Here's a fresh brush. When it wears down to the dotted line, it will be too short to reach the comm and your motor will stop running.

A Sounds like a "hung brush," Iggy. The brushes contact the commutator to make the motor run. If either of the brushes doesn't contact the comm, the motor won't turn. Giving the car a shove or tap is usually enough to free up the hung brush. A hung brush can be caused by debris in the brush hood, a bent brush hood, tangled or too-short brush shunts, or worn brushes.

To diagnose the problem, remove the brush springs and slide the brushes up and down in the hoods; they should move freely. If they don't, clean the hoods out with motor spray, and try to slide the brushes again. If they still stick, look for damage; you may have bent or crushed one of the hoods in a crash, and that could cause a brush to hang up. While the brushes are out, check them for wear. If they're too short to reach the commutator, your motor isn't going to run.

T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel Phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10.003" shims. 2 sets needed per truck. RRP 8590

T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. RRP 8562. Older style half shafts use Brake Kit RRP 8560.

DON'T SETTLE FOR SECOND!



T-Maxx Vented Flywheels



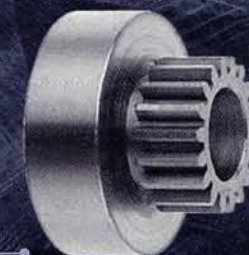
Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 8551 Blue, RRP 8550 Natural Silver. **NEW 2.5-Maxx Vented Flywheel, Blue Only RRP 8552.**

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP 8590 Diff Gear. RRP 8591

T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

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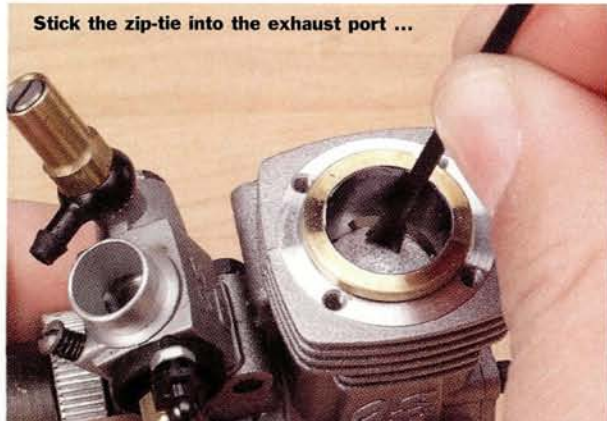
4968 Meadow View Drive · Mariposa, CA 95338 · Voice 209.966.2465 · Fax 209.966.5937

Q STUCK SLEEVE

I replaced my Kyosho V-One S's stock engine with an O.S. CV last summer, and after putting a lot of fuel through it, I think it's ready for a rebuild. This will be my first time rebuilding an engine, and I'm confident I can do the job as far as understanding what I'm doing, but I'm already stuck. Or I should say, the sleeve is stuck. I can't pull it out with my fingers, and I'm afraid to use tools on it because it's brass and I don't want to damage it. Heating the engine in an oven has been suggested, but it seems as if there should be an easier way. How do I get it out? [email]

Carl Supan

Stick the zip-tie into the exhaust port ...



A As with so many things in life, the answer is

"zip-ties." Here's what to do:

1. Remove the heat-sink head (you've probably already done that, right?).
2. Rotate the flywheel to bring the piston to bottom dead center.
3. Lower the locking-nub end of a small zip-tie into the sleeve, then hook it into the sleeve's exhaust port. If the nub is too big, just cut it in half.
4. Now, just let the piston do the work. Crank the flywheel to bring the piston to top dead center. It will jam against the zip-tie on the way up, and that will push the sleeve out of the block. The soft plastic won't mar the piston or sleeve. Cool, eh?

As you disassemble your engine, pay close attention to the orientation of the internal parts. The sleeve will be indexed to the case, but the connecting rod, piston and backplate can be installed in more than one position—but only one is correct. Making notes is the best bet, but when in doubt, remember that the flat spot on the backplate faces up; the little hole above the "big end" of the conrod should face the crank bearings; and if there's a cutout in the piston, it usually faces the back of the engine.



... then turn the flywheel to push out the sleeve. Simple.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

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RC-10GT 32 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T. RRP 2263 - RRP 2267

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

DON'T SETTLE FOR SECOND!

TC3 Ultra 48 Pitch Spurs



Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T. RRP 1670 - RRP 1680.



Q CELLS WON'T STICK

I've finally made the leap to building my own packs, but I'm having a heck of a time getting the pack to stay together. I solder the bars on, and everything looks good, but as soon as I flex the joint to test it, the bar pops off. The solder seems to stick to the cells OK, but the bars are a problem. I'm using a 40W pencil-style iron, Deans battery bars and RadioShack 60/40 solder. Any ideas?

A It sounds as if your iron is up to the task (although at the low end of the wattage range), and that you've got the right solder. I think preparation is the key to solving your soldering problem. First, make sure that your soldering iron's tip is clean. If it's crusted with scale, replace it. Be sure to tin the new tip by letting a blob of

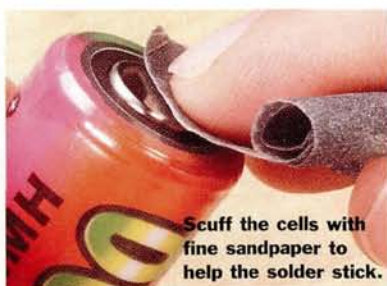


It's also a good idea to tin the bars; a "third hand" makes the job easy.



For best results, use a battery jig. Deans makes the best.

solder melt on it for about a minute; then wipe the tip on a damp sponge. Next, make sure that the iron is getting hot enough. The solder should melt the second it hits the tip; if it doesn't, the tip isn't hot enough. Next, prep the cells by scuffing the ends with fine sandpaper, then dab with flux paste and melt a spot of solder onto each end. You should also tin the bars with solder. A good soldering jig can also make a big difference in the quality of your soldering job. Deans makes the best, and it only costs about \$15. ■



Scuff the cells with fine sandpaper to help the solder stick.

TOOLBOX

Du-Bro Kwik Klip Extreme

If you're still hassling with cheap glow starters, do yourself a favor and move up to a high-quality unit like Du-Bro's Kwik Klip Extreme. It's got a heavy-duty shaft and rugged clamping mechanism, screw-apart battery compartment, and includes a protective rubber cap to keep the contacts clean and prevent shorting. You can drop in an alkaline C battery or sub-C rechargeable for power (not included). The Kwik Klip Extreme comes in three anodized color combos: blue/gold, purple/gold and black/gold.

Kwik Klip Extreme blue/gold—item no. 877; \$20.
 Du-Bro Products
 (800) 848-9411; dubro.com.



HPI Savage 21 Nitro Steel Combo



This new 52 tooth Spur and 14 tooth Clutch Bell are CNC machined from solid steel and then hardened for unmatched performance and durability. RRP 7052

NEW

HPI Savage 21 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 7000

NEW

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck. RRP 1860 thru RRP 1896.

Electric Car And Truck Pinions:

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

firstlook >>>

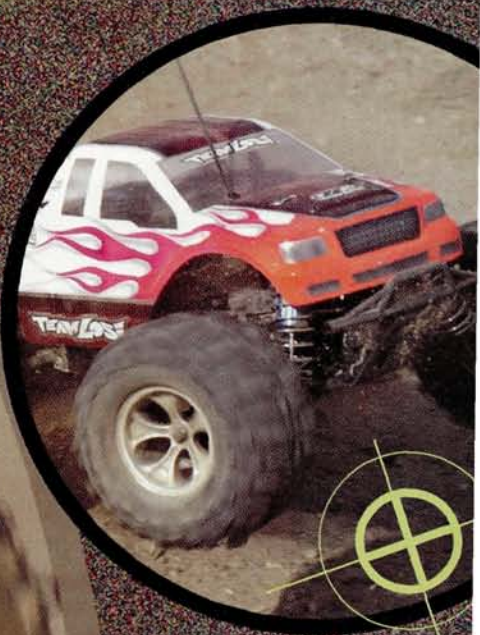
by Jason Sams



SPY

TEAM LOSI
NITRO MONSTER
PROTOTYPE

HUNTED!



PE

In the world of full-scale auto journalism, "spy photographers" are a key part of the scene. They stalk the test tracks and corporate proving grounds with their long lenses hoping to catch a glimpse of the new Corvette, Cadillac, Mustang and any other new-car quarries. That sort of subterfuge generally isn't viable in the RC world because the cars are easy to hide, but sometimes, you get lucky. And man, did I get lucky! >>>



TEAM LOSI MONSTER

This is a very big truck! Its footprint looks much larger than any other monster's on the market. As a matter of fact, it seems that everything on the truck is substantially oversize—especially the shocks. Losi's first foray into the monster world is the most massive monster truck yet.

SPY STORY

While passing by Ontario, I decided to swing by Team Losi. I had a few questions about the new Kinwald buggy (reviewed in this issue), and I hoped for a little face time instead of trying to describe parts over the phone. I parked my truck at Team Losi HQ and heard something nitro-powered buzzing around, so instead of heading for the lobby, I took a walk around back. And there it was: Losi's new monster truck undergoing some blacktop testing. The Losi crew ran at least two tanks of fuel through the truck before they spotted me, but they were too late. I had seen too much!

The next thing I knew, I was ushered into "Pops" Losi's office along with all the company higher-ups. I knew that they'd either have to kill me or give me the scoop (I was hoping for the scoop), so I argued that everyone knew a Losi monster is coming; the only question was "When." So why not now? After an hour or so of back and forth with the Losis, they agreed to give me a limited look at this top-secret and eagerly anticipated vehicle. So the Team Losi monster makes its debut right here, right now!



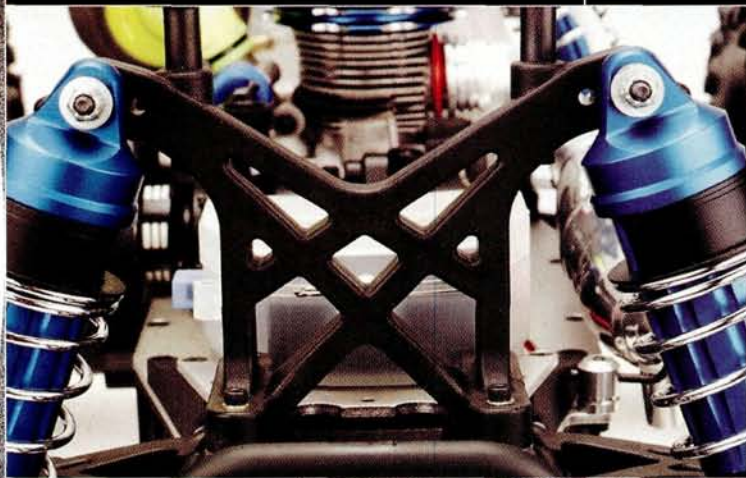
REAR-MOUNTED FUEL TANK

The fuel tank is not only big, but it's also mounted on the chassis' centerline so the fuel level won't affect the truck's lateral balance. The tank is located in the rear of the chassis to offset the electronics up front. The tank's primer pump looks well-sealed, and an overflow drain helps keep the chassis clean. Best of all, the tank location lets you refill with the body on.



RADICAL RUBBER

The tires are huge and mounted on 5-spoke wheels. The rubber felt like one of Losi's racing compounds, but with only a quick squeeze to go on, it's hard to say which one.

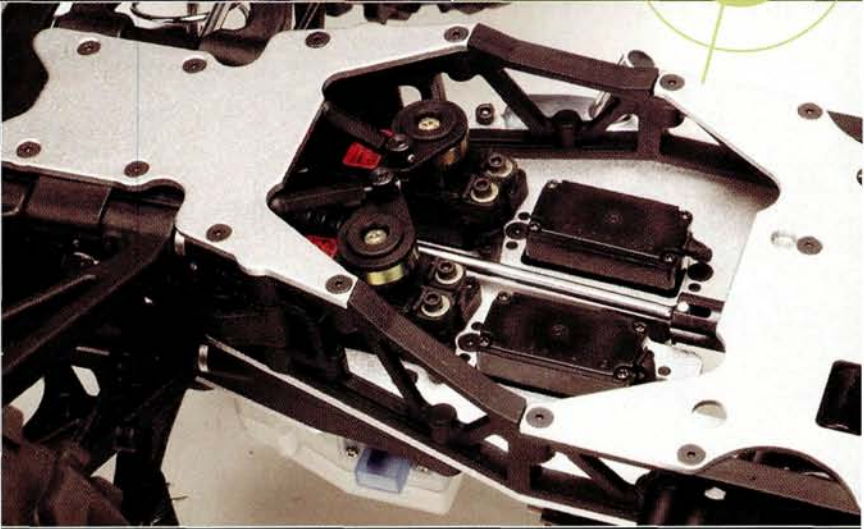


TOWER OF POWER

The shock towers and bumpers are very thick, so the Losi monster should be able to take a pounding. Removing the towers for suspension maintenance should be easy; it looks like you only need to remove four screws.

SECRET SHIFT?

The size of gear cover suggests there's a 2-speed transmission underneath it. Team Losi didn't reveal what's going on in the gearbox, but when I saw the truck run, I could hear the gearbox shifting.



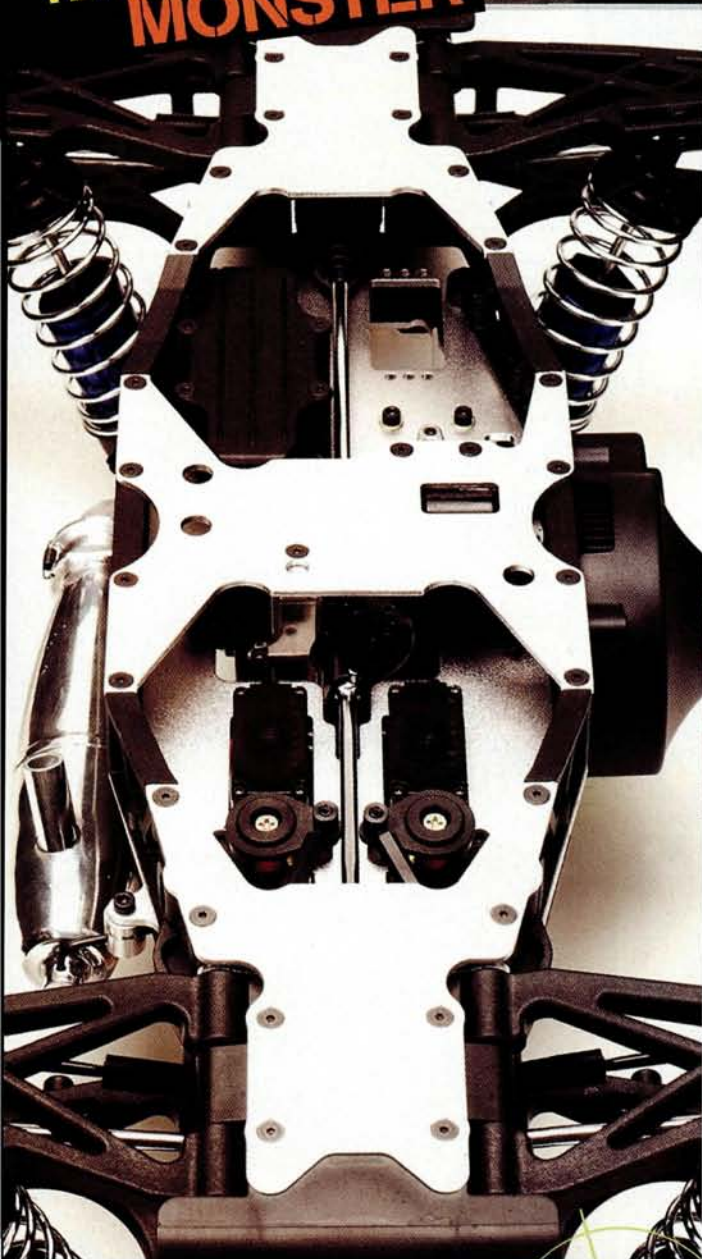
DUAL-SERVO STEERING

A pair of servos with independent servo-savers aim the Losi monster's massive tires, and there's room between them for the front drive shaft. Note that the steering bellcranks are supported by the webbing that joins the chassis plates. The photo also shows the on/off switch enclosed in a protective silicone boot (it's the little blue box that peeks out at the bottom of the shot).





TEAM LOSI MONSTER



CLASSY CHASSIS

The chassis is built with molded trusses squeezed between thick aluminum plates, and it appears well designed for strength and easy component access. It looks as if Losi was looking to build the most rigid chassis possible while minimizing weight. Look closely, and you'll see the truck's dual-disc brake under the center plate.



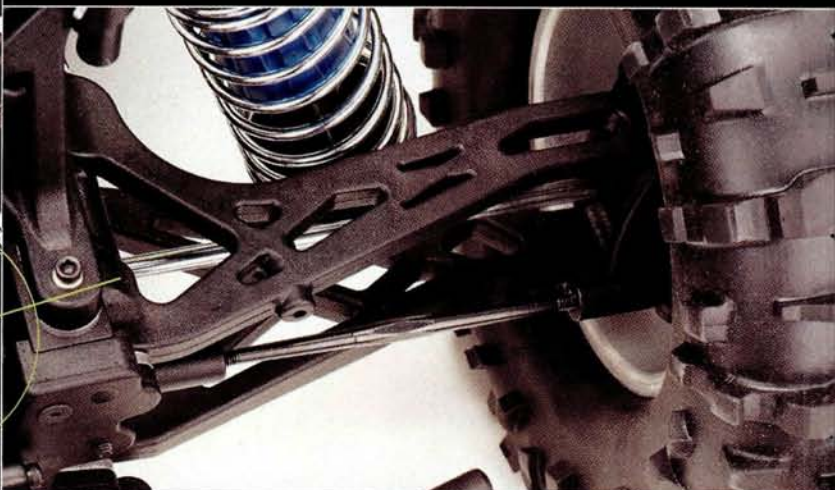
MACH .26 POWER

A very big truck deserves an equally big engine, and it's almost a sure bet that the new Losi will come with a Mach .26 6-port engine. High-performance features include "slinger" grooves on the crankshaft to promote fuel flow, a double-knife-edged rod to reduce high-rpm turbulence, a 7.5mm slide-valve carburetor, a rubber-sealed front crank bearing and a racing tuned pipe with a tubular manifold.



CASE CLOSED

A translucent radio case holds the receiver and receiver pack, but I wasn't allowed a look inside. The proto truck has four JR servos, two of which are dedicated to steering. At least one has to work the throttle and brake, but the function of the fourth is a mystery. Is it for an on-the-fly shifter? A reverse mechanism? Or something entirely different? Losi wasn't telling.



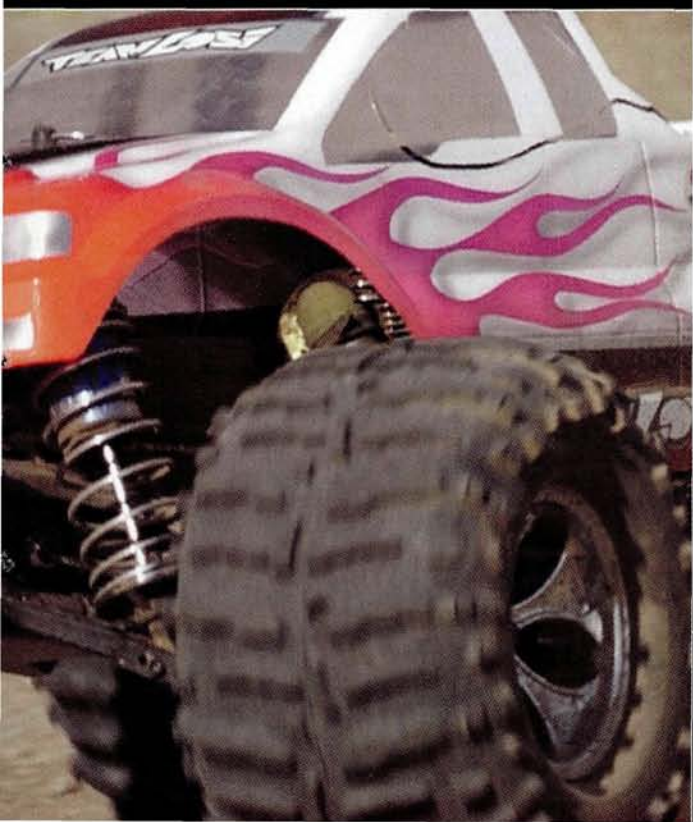
ARMED FOR BATTLE

The rear suspension uses turnbuckles to set toe. The suspension arms look more like racing pieces than overbuilt monster parts, but look how much material wraps the hinge pins where the arms meet the chassis. Losi put the beef where the arms are most stressed.

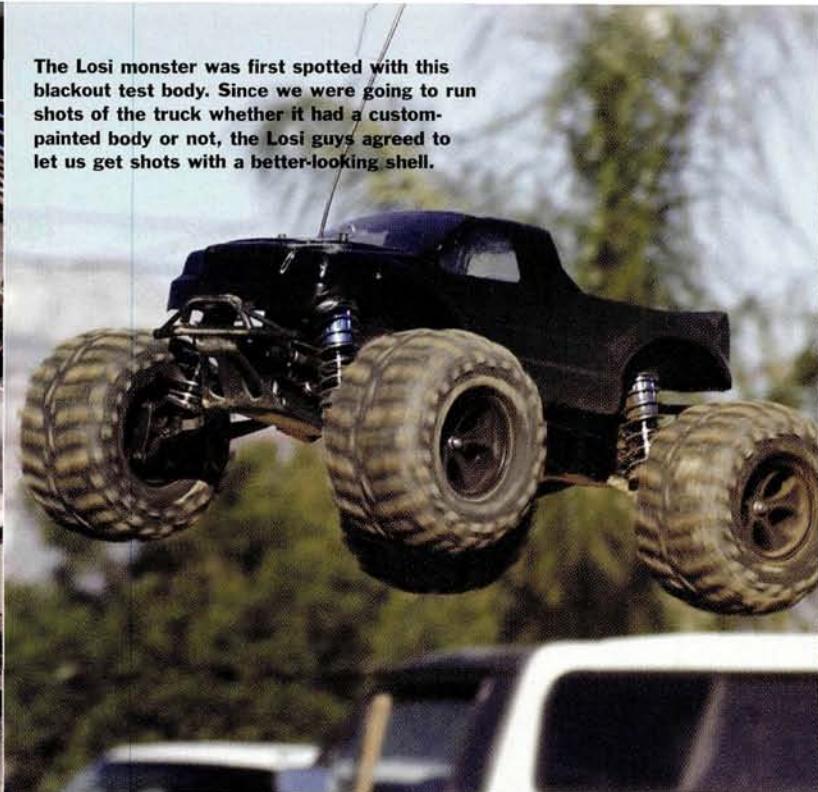


GIANT SHOCKS

The rumors are true: Losi has bypassed the 8-shock trend in favor of a racing-style 4-shock setup. The shocks are scaled up to match the truck's gargantuan size; for proof, take a look at the standard Losi shock alongside the big blue boinger. The shocks use Losi's proven cartridge design and are equipped with heavy-duty springs, a bleeder vent, and some pretty trick-looking millwork on the bodies.



The Losi monster was first spotted with this blackout test body. Since we were going to run shots of the truck whether it had a custom-painted body or not, the Losi guys agreed to let us get shots with a better-looking shell.



PROTO-POUNDING!

Since there was no way for them to un-spill the beans, it was easy to convince the Losi guys to let me follow them to nearby Revelation Raceway to watch the truck in a track session. The truck looked exceptionally planted, removing any doubt that 4 big shocks would work any less well than 8 "regular" shocks. The suspension was impressively active, even with those big tires, and the truck looked as fast—or faster—going around the track as race-prepped monsters I've seen. It's definitely nimble, especially by monster truck standards, and it looks as if it will be race-ready right out of the box. I also noticed the truck had a very tight turning radius. Some monsters need every inch of the track to get through tight corners, but Losi's big rig had plenty of steering to snake through tight stuff. And it sounded awesome! The Mach .26 sings a raucous high note through the aluminum tuned pipe to signal that something big is comin' through. The engine made very good power and shot the truck down the straights with surging blasts of acceleration. It looked as quick as the hottest big-block conversions we've built, and I estimate it's capable of speeds approaching the 40mph range. It looked as if the truck's disc brakes did a good job of slowing and stopping it. I didn't get the opportunity to handle the trigger myself, but the Losi drivers were able to push the truck hard into corners and let the brake do the work instead of chopping the throttle early to coast through turns (as some other big rigs require). The new truck also seems to be very easy to work on; when the guys took it off the track to make adjustments, they did all the wrenching without disassembling anything. So when do we get to drive one?

SOURCES

TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.

First of the new "Little Gear" series, Tamiya is proud to release the new 1/18 scale TLT-1 (Tamiya Little Truck) Rock Buster. Designed to use full-size R/C electronics, powered by a 540 motor, with 4-wheel drive, 4-wheel steering capability and multi-link cantilever suspension. The Rock Buster isn't your ordinary 1/18th scale vehicle. This monster is also equipped with four aluminum oil-filled dampers to handle any terrain, and an adjustable center differential for traction management and cornering similar to what's found on 1/8 nitro off-road buggies. The Rock Buster has more standard features than most 1/10 scale monster trucks. Being less than 30cm (1 foot) long, this truck can be as much fun in the house as it is outside. A lightweight durable polycarbonate body combined with loads of metal parts makes this little truck super tough. So get yours today at your local hobby source or visit www.tamiyausa.com for more information.



The belt driven center drive-train makes 540 size power transfer extremely smooth and the standard pattern spur gear hub gives the TLT-1 gearing flexibility to suit any 540 motor.

The TLT-1's cantilever suspension is designed specifically for the small confines of the 1/18 scale TLT-1 while providing long stroke suspension and maximum axle articulation.

Little Gear

TLT-1 Battery Pack
Item 90492

**2mm Thick Aluminum
Main Frame**

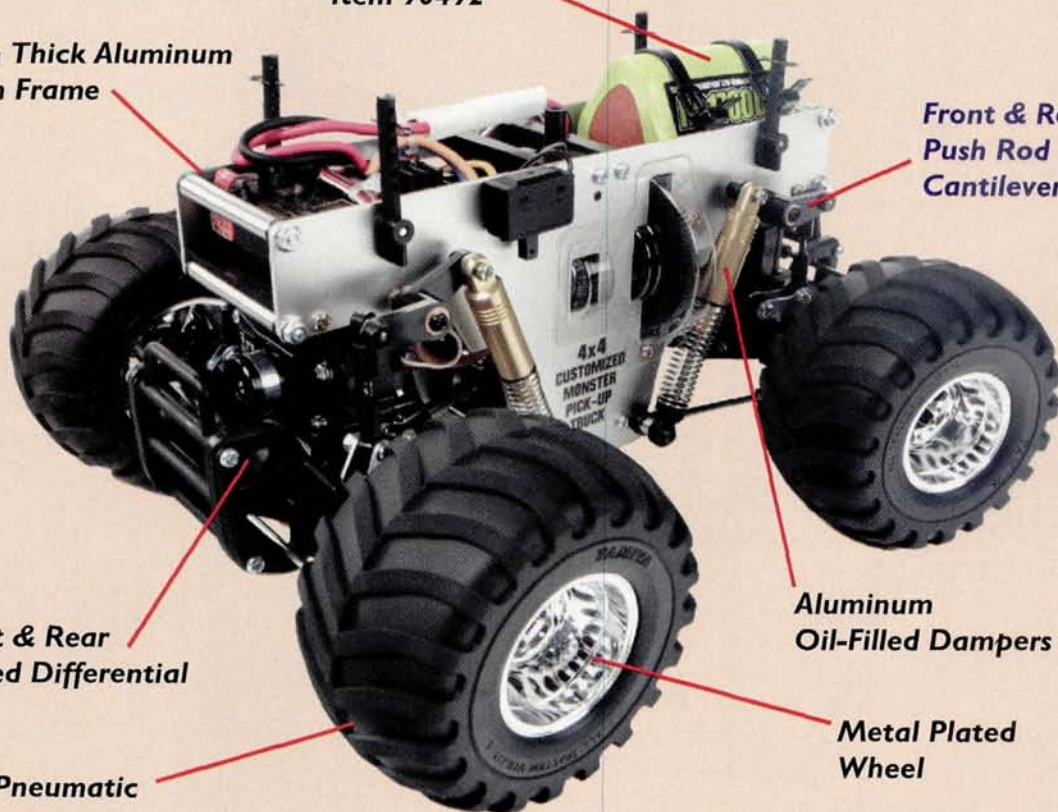
**Front & Rear
Push Rod Type 4-Link
Cantilever Suspension**

**Front & Rear
Sealed Differential**

**Aluminum
Oil-Filled Dampers**

**Metal Plated
Wheel**

**Semi-Pneumatic
Tires**

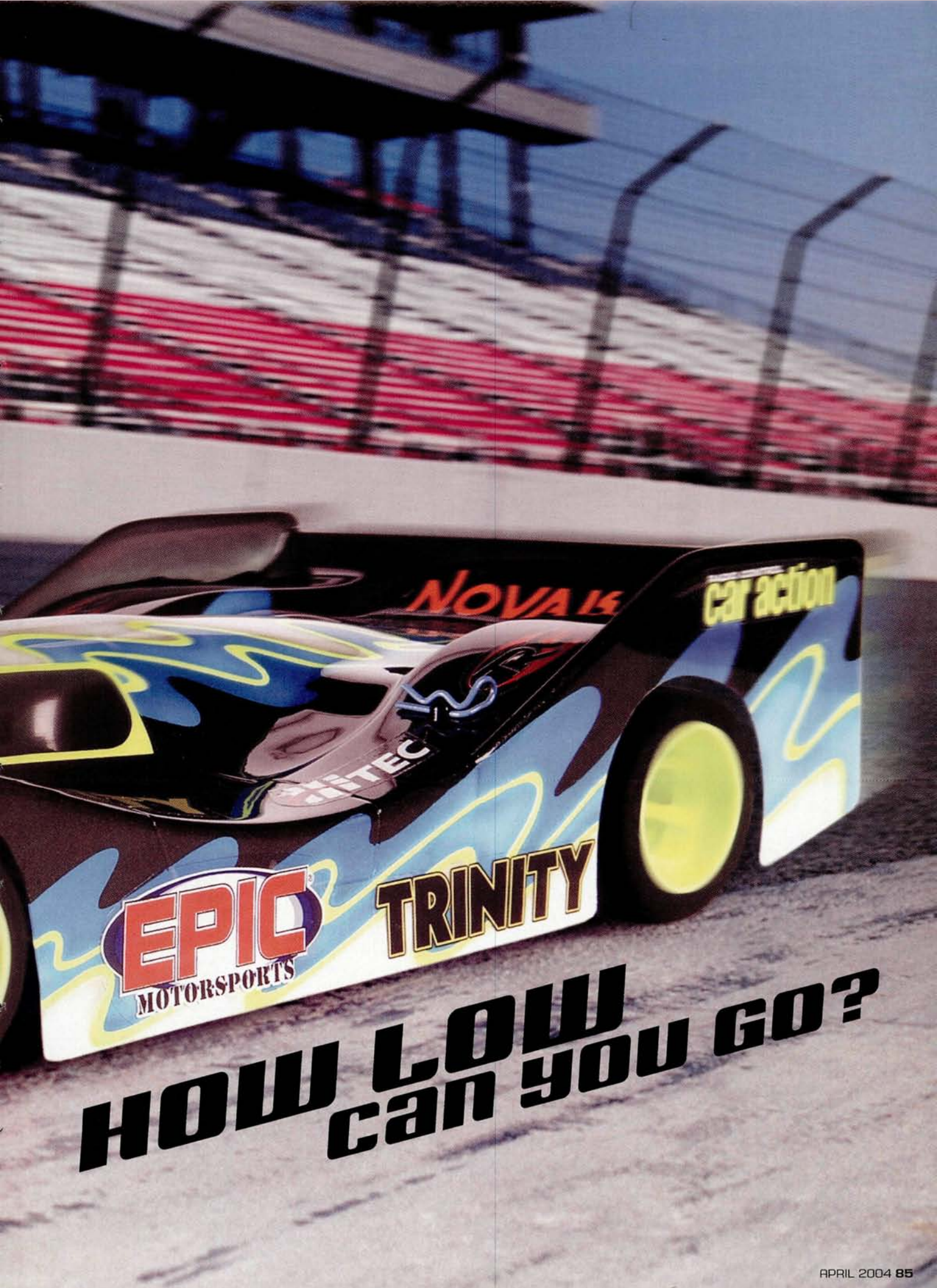


**Tamiya TLT-1 Battery Pack and electronics sold separately.*

Trinity Reflex 12

WHEN TEAM TRINITY SET OUT TO CREATE its new, 1/12-scale pan car, they had a single design concept serving as inspiration: a low center of gravity (CG). One look at a Reflex 12, and you'd be hard-pressed not to notice how slammed this chassis is. Trinity made every effort to lower the center of gravity because as racers and engineers, they know a lower CG will deliver faster corner speeds, which results in race-winning lower lap times. Trinity didn't forget any of the other qualities that have made its other RC cars successful. The Reflex 12 comes with the same high-quality materials and engineering as Trinity's other kits. Let's take a look at the car that is certain not to only rip up a racetrack but can also spank 'em at any limbo contest.





**HOW LOW
can you GO?**

KIT FEATURES

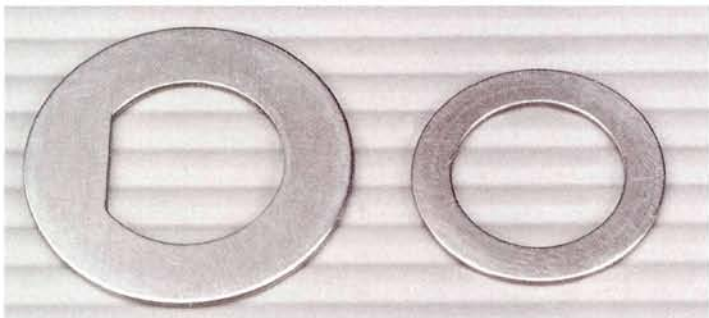
CHASSIS. The first thing you'll notice is the deep-blue color of the main chassis plate; you just can't miss it. The same trick-looking, 3mm-thick carbon fiber is also used for the flat chassis and suspension pieces; in total, six parts are fashioned out of the eye-catching blue stuff. Besides looking good, the material is lightweight and rigid, so it's an excellent platform for a race car. The overall chassis design on the Reflex 12 is very straightforward and, for the most part, rather simple.

Up front, a pre-cut, low-profile foam bumper is mounted to a wide piece of carbon fiber. This separate section supports the foam bumper and might, at first, seem unnecessary, but if you have a nasty wreck, you'll be glad that you have to replace only that piece instead of the entire chassis plate.

On the outer edges of the bumper assembly are adjustable aluminum body-mount posts. The hollowed-out aluminum mounts not only reduce the weight, but they are also much more unyielding than the commonly used plastic or nylon mounts. Because the aluminum posts won't bend, the body will stay in position, and the car will handle better. They also do a great job of transmitting the body's downforce to the chassis. On the other hand, if you tend to hit a lot of stuff, their lack of shock-absorbing flexibility might lead to broken parts. So, if you crash more often than not, pick up a set of plastic or nylon body mounts.

The front suspension is attached directly behind the bumper assembly, and there's ample space for the electronics. To reduce weight, Trinity has cut out the space between the front suspension arms and the space underneath the steering servo. Cutouts for the battery cells flank the tongue section of the rear suspension's T-bar, and they position the batteries two to a side. Directly in front of the T-bar is an aluminum clamping antenna mount. This two-piece design securely holds the included fiber-glass, rollover-antenna mast.

The rear body mounts are slightly taller versions of the front units, and two holes in the rear cross-brace allow you to move the mounts to adjust the rear downforce.



The Reflex 12 uses "large" diff rings. The ring on the right is the older style that was common in 1/12-scale. Notice the D-shape in the Reflex 12's ring; that locks it into place—no gluing or pinning.

DRIVE TRAIN. The Reflex 12 uses a very simple and efficient drive system that consists of a graphite axle and a ball differential that are contained in the included 96-tooth spur that is spun directly by a motor-mounted pinion gear. The included 64-pitch gear is by Kimbrough; Trinity lets you choose the pinion that is best for your application.

The diff rings lock in place for better and more consistent diff action. The inner circumference of each ring is a D-shape (the outside circumference is the typical circular shape) that matches the fixed axle hub and the right wheel hub. The rings are also "large"; these tend to be very durable and provide better diff performance. The rear axle and the rest of the car spin on Teflon-shielded ball bearings. On the axle's left side is a very trick and balanced clamping wheel hub.

BUILDING & SETUP TIPS

For the most part, the Reflex 12 is very easy and straightforward to put together; it's an excellent kit. Make sure that you follow all the steps in the instruction manual and take the time to do all the preassembly chassis prep.

Doing the chassis work before you get started is key, but the very best tip I could give you is to organize all the parts and pieces before you begin assembly. Open each parts bag (kit bag) and empty its contents into its own paper cup. Do this for each of the approximately 25 bags. As you empty each bag, use a marker to label the paper cup with the bag number (i.e., 1 to 25) and the last two digits of the Trinity replacement part number found in the "Parts List" section of the manual. Trinity refers to the long replacement part number throughout the manual, so labeling each parts group as instructed will eliminate confusion and make it so much easier to find the part you're looking for.

STEP A3. Put down those metal washers; the T-bar spacers used in this step are nylon, and they're found in bag no. 6. The bag contains many spacers of different thicknesses, so make certain that you select the correct pieces.

STEP A5. The 4-40x1/4-inch flat-head screws that retain the damper-tube ball studs might need to be trimmed. Mine were so long that the ball studs couldn't be snugged down properly, so I donned a set of safety glasses and fixed the problem in about two seconds by using my Dremel tool fitted with a cutting disc.

STEP A6. Tighten all of these screws in an "X" pattern so the pod doesn't get tweaked. It also helps if you place the pod on a perfectly flat surface when you torque things down.

STEPS B1 & B2. Assembling the damper tubes can be difficult, but you can do a few things to make this task a little easier. Wherever possible, use a 4-40 tap to prep the holes for the threaded rods. Also, apply a bit of white bar soap (or even grease) to the threads as a lubricant. Last, chuck the damper tube into the Dremel tool to hold it in place as you thread in the rod.

STEP C8. Check the kingpins for burrs. Regardless of how they look, I polish mine with a Dremel tool fitted with a polishing wheel and some medium polishing compound. This ensures that the suspension will be bind free and can work properly. I also do the same for the pivot balls in step A2. The 0.010-inch shims used for this step are the gold-colored ones; if they don't fit over the end of the kingpins, you'll have to file down the very tip of the kingpin a bit—just enough so the shims will slide on with ease.

STEP E1. Sometimes the molded ride-height adjusters can be too tight, and that can cause the

bearings to bind slightly. If your bearings fit snugly but can be easily removed with just a push of a finger, then your ride-height adjusters don't need any work. A good test is to assemble the ride-height adjusters, bearings and axle in the pod and then flip the chassis on its right side. If the axle doesn't slide out on its own when you flip the chassis, there is some binding. I ran a 3/8-inch drill bit through each ride-height adjuster and did it again after they were in the pod. The first step sizes them perfectly to the bearings, and the second step aligns them in the pod.

STEP E2. I ran each diff ring in a figure-8 pattern over a wet sheet of 800-grit sandpaper to ensure they were perfectly flat. This doesn't take long and makes for better feeling diff action.

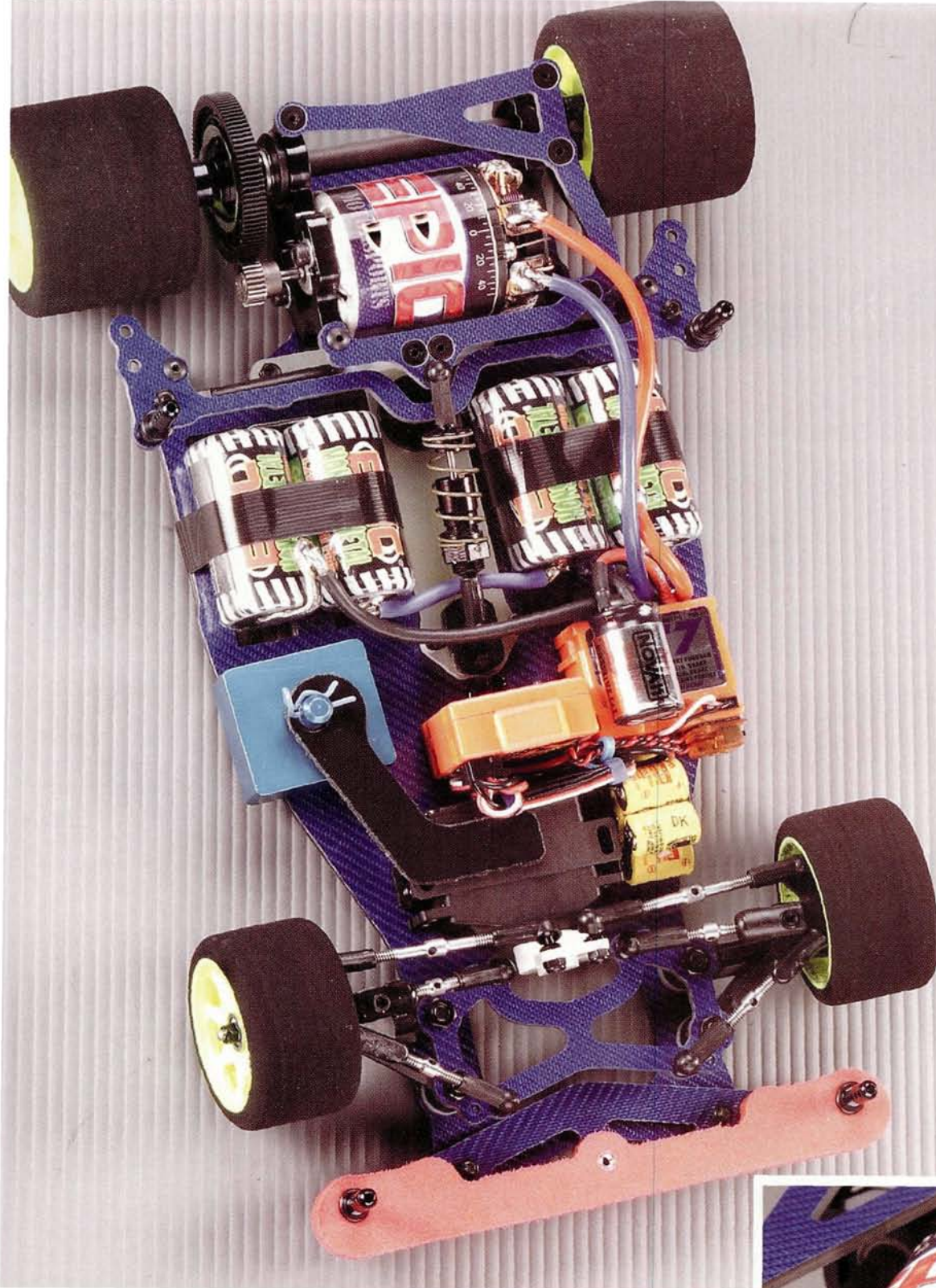
STEPS F1 AND F2. Use needle-nose pliers to spread the O-rings so you can just slide them over the body-post brace pieces. Watch out for the occasional flying O-ring as you do this.

you'll need

- Body
- Transmitter and receiver
- Steering servo
- Electronic speed control
- Motor
- Pinion gear
- 4-cell battery pack
- Charger
- Servo-saver

factory options

- Trinity Reference T310 body—item no. TRI39700
- Trinity Reference T310 body (lightweight)—TRI39701
- Foam 1/12-scale, on-road car stand—RC5790 (black); RC5790B (blue)
- Reflex 12 car stand with fan—TRI30004
- Ceramic bearing kit for Switchblade 12—RC6105



SPECIFICATIONS

MANUFACTURER Trinity
MODEL Reflex 12

SCALE 1/12
PRICE \$225
Varies with dealer

DIMENSIONS
Wheelbase 7.7 in. (195mm)
Width (F/R) 6.4/6.7 in.
(163/170mm)

WEIGHT
Total, as tested 29 oz. (822g)

CHASSIS
Type Flat pan
Material 3mm-thick, blue carbon fiber

DRIVE TRAIN
Type Direct drive
Primary Pinion(not included)/
96T spur gear
Drive axle Graphite
Differential Adjustable, ball-type
with locking diff rings
Bearing type Teflon-shielded
ball bearings

SUSPENSION
Type (F/R) Independent coil-
sprung/single shock, twin
damper tube, T-bar
Shock Threaded, aluminum-body
Associated VCS

WHEELS
Type Yellow, one-piece plastic,
eight-spoke design

TIRES
Type Mounted and trued foam

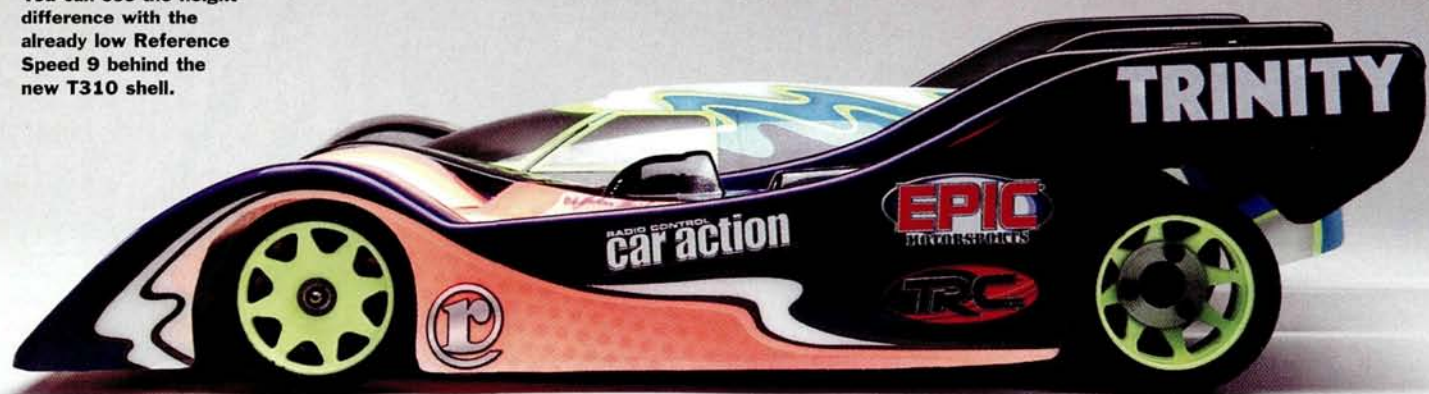
Below: this photo shows how Trinity modified its design to lower the front of the pod. In addition to slamming the top pod plate, the motor mount positions the motor 0.050 inch lower.



Left: the front suspension is very adjustable. By incorporating turnbuckles, the Reflex 12 offers a wide tuning range for camber and caster. The car's roll center can be tweaked by raising the turnbuckle ball studs or moving them to new locations.



You can see the height difference with the already low Reference Speed 9 behind the new T310 shell.



SUPER-SLAMMED SHELL

To take full advantage of the Reflex 12's ultra-low center of gravity, Trinity pressed out a new Reference shell dubbed the "T310." It has the same super-slammed profile as the chassis, and the open-cockpit Can-Am-type body is so low, that it's unlikely that it will work on any other chassis. This new shell is so slammed that risers had to be molded in so the battery's solder-point tabs would clear it. Now, that's what I call low! For good track handling, front side dams and high side boards have been incorporated into the shell for an aggressive, yet stable, platform.

SUSPENSION AND STEERING. The front suspension is an undamped, coil-spring-supported design that consists of fixed lower arms on each side, with two turnbuckles forming each upper-arm assembly. This setup can be easily adjusted and precisely tuned. The front turnbuckle adjusts caster, and the rear turnbuckle allows you to tune camber. To adjust the roll center, move the inner turnbuckle mounts and/or raise the ball studs. Changing the roll center will alter how aggressively the Reflex 12 steers.



Aside from the pod design, the Reflex 12's rear suspension is pretty typical. A single shock and two fluid-filled damper tubes work with a fiberglass T-bar. The design is simple but very effective. Two tweak screws (arrowed) make setting up the chassis very easy.

For most setups, the stock configuration will yield the most responsive steering.

The rear suspension has the typical T-bar workings, with a pod that's supported off the rear. The tongue of the fiberglass T-bar is mounted to the chassis with two pivot balls: one in front of the other and riding in two-piece plastic sockets. The front pivot-ball socket has been modified so that tweak screws can pass through the T-bar and bottom out on the chassis. Two fluid-filled plastic tubes, commonly called swizzle sticks, damp the pod's lateral movement. A single Associated VCS Micro Shock soaks up the bumps.

The rear pod is what really separates the Reflex 12 from any of the other 1/12-scale pan cars currently on the market. On pan cars, the pod is the tallest component, and it significantly raises the car's overall CG. To lower the CG, and thus improve the cornering ability of the Reflex 12, Trinity designed this pod to be super-slammed. The front segment has been lowered so that the top plate slopes down toward the front quite a bit, and the aluminum motor plate positions this heavy component 0.050 inch closer to the ground. The result is a pod that is just as strong as previous designs, yet it dramatically lowers the Reflex 12's CG.

BODY, WHEELS AND TIRES. TRC medium-compound foam tires are included with each Reflex 12 kit. These will typically be green compound, but that can vary, depending on availability. The tires are mounted on TRC plastic rims and come trued down to racing size.

As is often the case with racing kits, Trinity doesn't include a body for the Reflex 12; the choice has been left up to you. For this "Track Test," I

used the more traditional Reference Speed 9 shell, but I do plan to get plenty of wheel time with the new low-profile Reference T310 (see the "Super-slammed shell" sidebar). I'll be sure to let you know how deadly a combination the new chassis and body proves to be.

RATING THE TRINITY REFLEX 12

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	The somewhat brief text is more than made up for with excellent illustrations.				
PARTS FIT AND FINISH	The quality of the materials is excellent, but some hand-fitting is required.				
CORNERING ABILITY	The Reflex 12 has the fantastic cornering ability that I would expect from a 1/12-scale racer.				
ACCELERATION	Direct-drive setup delivers great acceleration, even with 4-cell power.				
DURABILITY	Only minor scratches on the bottom of the chassis after testing. But, I did break the body mounts.				
ESTIMATED TOP SPEED	25MPH*				
BEST BUYER	On-road racers who are looking for the latest in 1/12-scale design				

* Top speed varies with equipment used.

LIKES

- > Slammed, low-profile chassis design.
- > Very easy motor access.
- > Blue chassis looks hot.
- > Tons of steering.

DISLIKES

- > Bag numbers don't match instruction steps.
- > Some hand-fitting required.

TEST GEAR



Novak XXL receiver

Novak's XXL receiver is a perfect match for a $\frac{1}{12}$ -scale racing machine. It offers glitch-free performance with an internal radio-frequency shield and low-voltage operation. It doesn't hog a lot of chassis space: the receiver measures only 1.3x1.1x0.5 inches.

Additional items used to complete the Reflex 12

Epic Binary2 Outlaw Pro stock motor

Epic Flat Wire Binary2 13-turn single modified motor



Epic Monster Metal 3300 Plus GP 4-cell battery pack



Futaba S9602

Hitec CRX FM transmitter

Kimbrough 20-tooth pinion

Kimbrough Servo-saver

Novak GT7 speed control

Trinity Reference Speed 9 body



PERFORMANCE

Lately, most $\frac{1}{12}$ -scale racing takes place on carpet, and although cars like the Reflex 12 hook up like you wouldn't believe on the soft stuff, these little pan cars actually have much deeper roots in running on asphalt tracks. I had been dying for a decent excuse to venture over to Hobby Chamber with its smooth, indoor, paved racing surface, so I packed up the Reflex 12 and my gear and took it all to West Haven, CT, for my performance assessment of Trinity's new low rider.

When the battery pack peaked, I took to the track. I started out with the stock setup, including the tires. I did, however, completely sauce the rear tires to increase traction. So I could square away all the trims, the first few laps were slow ones, but I wasted no time getting up to race speed once the Reflex 12 was running perfectly straight.

Although I'll race this car in the Stock class, I ran the first pack with the Epic modified motor I was hooked up with. Even with only 4-cell power, the acceleration and top speed can only be described as insane! The Reflex 12 ripped hard out of each corner and actually had much more speed than I could use on this track. Even coasting through corners, this car was fast. Without drag brakes, I could let off early, coast through most of the corner and then jump on the gas hard after I was just past the apex. Without even the slightest suspension tweak, the Reflex 12 handled great and hardly slowed when running the course. Even down the long straight, I wouldn't stay at full throttle except for the briefest of moments. All of this made for some very fast laps. I only used the brakes in one section of the track, and they never faded on the GT7 ESC. The Novak speedo is a world-class unit, and it was certainly up to the task.

After running a full pack with mod power and being very impressed, I soldered in an Epic Outlaw stock motor to get a taste of what racing the Reflex 12 would be like. This car, like all $\frac{1}{12}$ -scalers, has very responsive steering, but with Stock-class power, it was a whole lot easier to run consistently lap after lap.

I also took out the receiver pack when I installed the stock motor (it's a must-have when you run a mod motor with 4-cells). RC racing legend Joel Johnson recommends running a receiver pack for both stock and mod. He stays that when the steering servo is juiced by only 4-cells, it can lose approximately 25 percent of its speed potential without a receiver pack. The slower steering suited me just fine, but if you race at a highly competitive level, take heed of Joel's advice.

As expected, with stock power, the Reflex 12 was slower off the line, but what it gave up in acceleration, it gained in run time. Considering the efficiency of a pan car's direct drive train and how much juice 3300s contain, you're doing something seriously wrong if you ever dump with a stock motor. With everything working as it should, the Reflex 12 will have no trouble finishing a four, five, or seven-minute Main with as much grunt as it started with.

Driving with stock power was a total blast; it quickly reminded me why this is one of my favorite racing classes. The Reflex 12 was precise in the corners. There was a ton of steering response, yet it was still very predictable, and there wasn't a hint of understeer. The Reflex 12 felt pretty dialed out of the box. The only thing I could see myself changing would be the tires.

THE VERDICT

Although some hand-fitting is required, it really isn't that big of a deal; that's just the nature of the beast with this type of machine. After all, $\frac{1}{12}$ -scale is the racer's class, and racers like to tinker.

The Reflex 12 is a well-thought-out design fashioned out of high-quality components and materials, and that makes it a hit with me. Instead of issuing a barely new chassis in a brand-new box, Trinity really pushed the envelope of current $\frac{1}{12}$ -scale pan-car design and introduced a new car and a new spin on the formula. I don't doubt that the Reflex 12's super-slammed stance will inspire other manufacturers to look at their cars' CG and maybe think about a little reworking.



SOURCES

EPIC distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com.

FUTABA distributed exclusively by Great Planes Model Distributors Co.

(217) 398-6300; (800) 682-8948; futaba-rc.com.

HITEC RCD INC. (858) 748-6948; hitecrdc.com.

KIMBROUGH PRODUCTS (714) 258-7425; kimbrough-products.com.

NOVAK (949) 833-8873; teamnovak.com.

TRC (732) 635-1600; teamtrinity.com.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

Yokomo MR-4BC Super Dogfighter 2 Special



FOR THE PAST FEW YEARS, YOKOMO'S ON-ROAD PROGRAM HAS FLOURISHED with new releases that include the shaft-driven MR-4 TC, extensions to the popular GT-4 line and even an updated $\frac{1}{12}$ -scale pan car. Meanwhile, Yokomo's sole off-road car, the MR-4BC Dogfighter 2, originally released in 2000, has waited patiently for an update. A "Special" kit appeared a couple of years ago and gave the BC a longer wheelbase for better bump handling and stability, but all has been quiet since.

All that has changed with the release of the MR-4BC Super Dogfighter 2 Special, which adds a graphite chassis and shock towers, titanium turnbuckles, threaded shocks and a host of other goodies to bring the BC up to "anytime, anywhere" competitive trim. Just look at the 2003 IFMAR 4WD Off-Road Worlds for proof: Billy Easton only had about two weeks of wheel time with the new Yoke, but he still managed to put it in the A-main!



ROLLIN' WITH THE
BIG DOG

KIT FEATURES

CHASSIS. The molded-graphite tub chassis is similar to the original's molded-composite chassis. Changes include certain features taken from the "Pro" version of the MR4-TC—in particular, the lowered motor-mount area that Yokomo's optional motor heat sink can be dropped right into. Battery cutouts along the chassis' right side drop the cells closer to the ground for a lower CG. A sheet of adhesive-backed clear plastic, along with a cutout template, is included to cover the exposed battery and motor cutouts underneath the chassis.

A composite upper-deck brace is used in place of the nylon "backbone" that was on the original car. Though this leaves the drive train exposed to dirt and debris, it makes the tub chassis much stiffer than it was in the BC's previous incarnation. The upper brace has a couple of mounting locations along the center to fine-tune the amount of stiffness it provides.

Batteries can be mounted with the included graphite battery retainer, but the instructions show how to install them more securely with strapping tape.

DRIVE TRAIN. An efficient and durable dual-belt drive system powers the BC. As expected in a Pro-level car, ball bearings are used throughout. The front differential has plastic outdrives to reduce weight and blue-anodized aluminum rings to prevent the outdrives from spreading under hard acceleration. Steel outdrives are used in the rear differential where more strength and durability are required.

The front belt rides on a center one-way bearing from the spur layshaft. This one-way gives the benefit of increased off-power steering (as provided by a front-mounted one-way) while the front end retains its adjustable differential action. All four corners feature steel universal drive shafts. The new steering blocks use oversize bearings that can handle more loads than the original BC's parts could. A ball-bearing belt guide is built into the motor mount. All in all, the BC's drive train is up to Yokomo's usual high standard of low friction and efficiency.

A cast-aluminum motor mount is also included and is supported by both the chassis tub and the upper deck with screws to prevent it from shifting in the rough stuff. An 84-tooth spur gear and lightweight 20-tooth pinion are included.

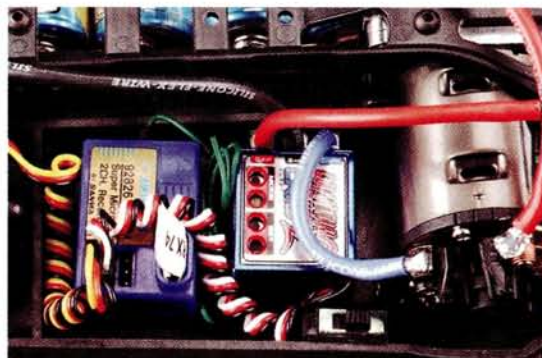
SUSPENSION AND STEERING. Hard-anodized aluminum shocks grace the BC's corners. The bodies are threaded for precise preload adjustments and have dual O-ring seals on the shaft end and a single O-ring seal on the cap end. A hole in the cap makes shock bleeding easy. Inside the shocks, a foam ring acts as a volume-compensation buffer when the shaft slides in and out of the body. The shock shafts are all titanium-nitride-coated stainless steel with a bright, smooth finish to help with consistent shock action. Like the tub chassis, the new shock towers are made from molded graphite.

The front A-arms ride on stainless-steel hinge pins and house the steering upright/steering arm assemblies, while the rear A-arms are mounted to a rear bulkhead that allows for adjustable wheelbase. The hinge pins are secured without E-clips; instead, they're held by retaining screws or bulkhead caps.

Steering is handled by a traditional dual-bellcrank design riding on ball bearings. An adjustable servo-saver is built in, and the aluminum posts and servo-saver parts are all anodized in blue to match the rest of BC's aluminum hardware. All the tie rods, including the camber links, steering links and bellcrank drag link are Lunsford titanium units—light and very hard to break. A Lunsford turnbuckle wrench is also included.

BODY, WHEELS AND TIRES. The BC's body is a sleek piece that tightly conforms to the tub chassis to help keep dirt out. Velcro strips hold it to the tub chassis, and nylon wing mounts hold the rear wing to the rear shock tower.

The stock tires are Yokomo's own Hot Laps with a low-profile mini-pin "fuzzy" design. White one-piece dish wheels adorn each corner. The wheels aren't mounted on the hubs with screws, as in the original BC, but are now keyed to the hubs with pegs molded into each wheel; this saves some rotating weight.



With the batteries mounted on the right side of the chassis, the other electronics (steering servo, receiver, ESC and motor) are all mounted on the left side for even weight distribution.

BUILDING & SETUP TIPS

The Super Dogfighter 2 Special includes the standard MR-4BC manual as well as supplemental sheets that cover additional steps and changes to build the "Special" version. Before you start wrenching, make notes in the main manual of the steps that refer you to the addendum. After you've done that, you should have a smooth build. The illustrations are clear, there are full-size hardware legends, and everything fits properly.

STEP 1. Instead of a battery brace to hold down the batteries, use strapping tape. Install the short rear battery post in place of the front and rear battery plate posts. It may be a pain to change battery packs, but the tape holds the packs in place better.

STEP 12. The manual instructs you to screw the ball joint into the servo horn, but the hole can strip pretty easily. Use a 3mm locknut on the other side of the horn to make sure that the ball joint doesn't back out.

STEP 13. Though it isn't really necessary, I like to tap every single hole that receives a machine screw, even if it does add a lot of time to the building process. But if I had to choose only two holes to tap on the BC (or on any MR-4-based chassis), it would be the two holes used to secure the rear of the upper deck with 3x35mm screws. These screws are particularly long, and it takes a lot of torque to get them screwed into the stiff graphite chassis material. Save yourself a sore wrist, and get out your 3mm tap before installing these screws.

STEP 15. The front shock tower is mounted on the bulkhead cap with two 3x12mm screws. If you use just these two screws, you will almost certainly break the bulkhead cap within a few runs (trust me on this one). There's an extra pair of 2x6mm self-tapping screws in bag 11. Screw these fasteners through the holes on the side of the shock tower and into the bulkhead cap to give the tower extra support and much needed strength.

you'll need

- Transmitter and receiver
- Electronic speed control
- Motor
- 6-cell battery pack
- Steering servo
- Charger
- Tire glue
- Polycarbonate-compatible paint

factory options

- Lower motor heat sink—part no. ZS-304HL
- Front one-way unit—ZS-640T

THE COMPETITION

CAR	BEARINGS	CHASSIS	DRIVE TRAIN	SHOCKS	TURNBUCKLES	DRIVESHAFTS (F/R)	STREET PRICE*	REVIEWED
Losi Triple-X4	Metal/Teflon shielded	Molded graphite	Single belt	Threaded aluminum	Titanium	Aluminum MIP CVD	\$330	2/04
Schumacher Cat 3000	Metal shielded	Graphite plate	Dual belt	Aluminum	Steel	Universal/steel MIP CVD	\$260	12/00
Yokomo MR-4BC Special 2	Metal shielded	Molded graphite	Dual belt	Threaded aluminum	Titanium	Steel universal	\$290	4/04

*Price varies with dealer

SPECIFICATIONS

MANUFACTURER Yokomo USA
MODEL MR-4BC Special

SCALE 1/10

PRICE \$290

Varies with dealer

DIMENSIONS

Wheelbase 10.24 in. (265mm)

Width 9.84 in. (250mm)

WEIGHT

Total, as tested 57 oz. (1,616g)

CHASSIS

Type Molded tub with upper brace

Material Graphite composite

DRIVE TRAIN

Type Dual-belt

Primary 20-tooth pinion/84-tooth spur gear

Transmission ratio 2.2:1

Final drive ratio 9.24:1

Drive shafts Low-friction universal

Differentials (F/R) Ball-type with nylon outdrives/ball-type with steel outdrives

Bearing type Metal-shielded ball bearing

SUSPENSION

Type A-arm with upper turnbuckle upper camber link

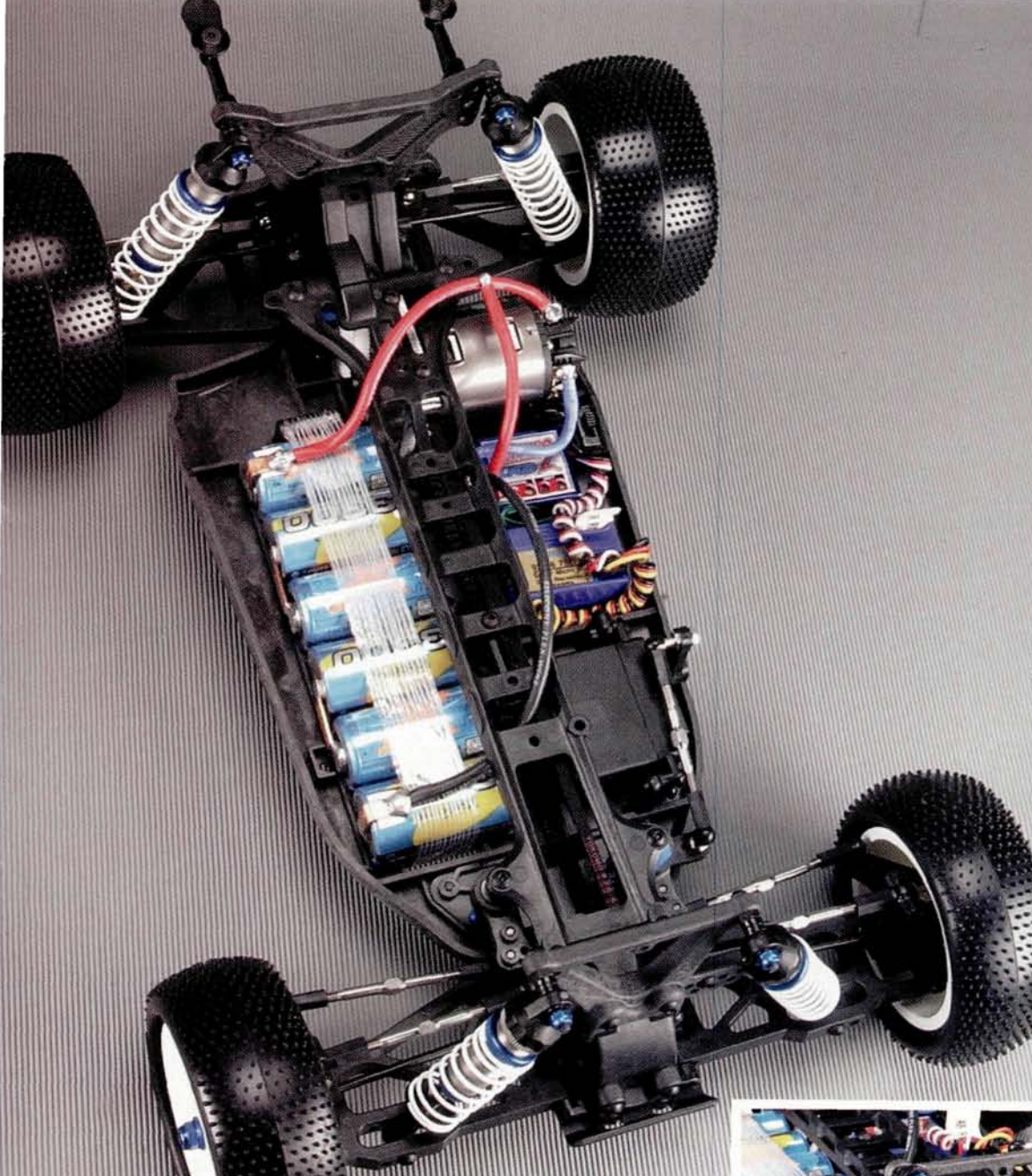
Shocks Threaded, hard-coated aluminum body with titanium nitride shafts and composite caps

WHEELS

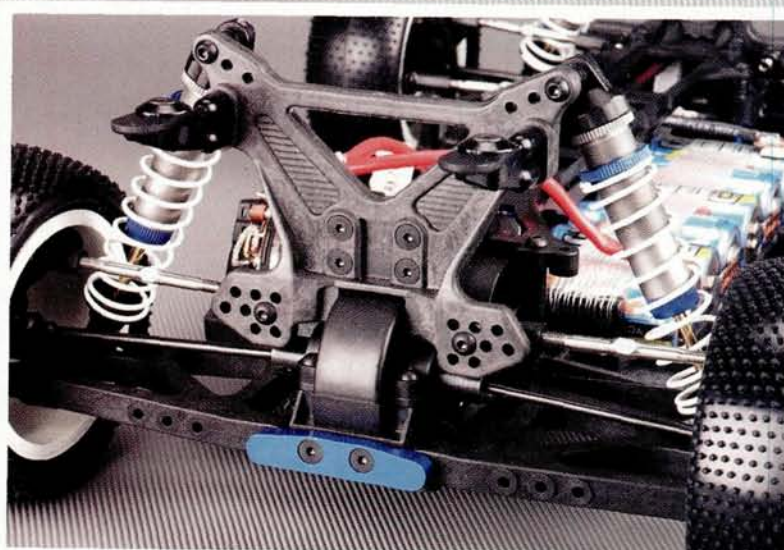
Type One-piece dish

TIRES

Type Yokomo Hot Laps mini-pin style



Right: the front shock tower is reinforced by the molded-in bar that spans the two upper mounting points. A close look at the shock caps will reveal the bleeder screws, which are a nice touch.



Left: eight inner camber-link positions help the Special get dialed in on a variety of track surfaces and conditions. The shocks are threaded for easy trackside tuning, and they too have multiply mounting locations.



Right: the Special's steering system uses a bellcrank setup with a built in servo-saver. Lunsford titanium turnbuckles are standard.

PERFORMANCE

I headed out to Hot Rod Hobbies' track in Saugus, CA, for testing. As the BC doesn't have a slipper clutch, I first had to break in and adjust the differentials so they would not slip when accelerating with the hot Reedy Kr 10x2 I was using. Once I was satisfied with the settings and had changed to a lower gearing (the included 20-tooth pinion was a few teeth too many for my motor), I started to push the BC hard around the track.

Within a couple of laps, I felt confident enough to really work it up to a race-level run. This new BC, with its long wheelbase, felt very stable in high-speed straights—much more so than the short-wheelbased original. The stock 45/35 front and rear oil setup was perfect for the hard-packed, blue groove Hot Rod track, and even the tires, with their low profiles and soft inserts, did the job well. Bumps and ruts weren't a problem for the damping the shocks provided; the inherent push of the 4WD platform made it hard for me to get the chassis out of shape even when I tried.

Jumping was drama-free. The buggy soared flat, nose to tail, over the jumps, and I easily controlled its in-air attitude with a blip of the throttle or a tap of the brakes. One thing I did notice was that the BC had a tendency to lean to the right in the air because the lightweight electronics I had mounted on the chassis' left side didn't quite counterbalance the battery on its right side. Fifty cents worth of ballast (two quarters, to be exact) taped on top of the receiver solved the problem. Depending on the gear you choose, you may not have to stick spare change on your Yokomo.

Starting with the setup detailed in the instructions, the BC is very much in the ballpark for a hard-packed, high-traction track. Looser surfaces will require some tweaks to the suspension setup, but the BC has so many tuning options in the box, a good setup won't be too hard to find.

THE VERDICT

The chassis' responsiveness makes driving the MR-4BC Special a real treat. It's a point-and-shoot affair that doesn't feel "on the edge." And because it's so easy to drive, it instills in its pilot the confidence that it will take the driving line you want it to. All in all, it is an excellent upgrade to a kit that was a decent performer on the right track but had been surpassed by its competition. This new version definitely has what it takes to go toe to toe with the other buggies in the class.



RATING THE YOKOMO MR-4 BC SUPER DOGFIGHTER 2 SPECIAL

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	Clear drawings, but you have to flip back and forth often through the supplementary sheets, which can get confusing.				
PARTS FIT AND FINISH	Excellent molding quality and parts fit; no hand-fitting required.				
ACCELERATION	The smooth drive train and lack of a slipper clutch make it very punchy.				
CORNERING ABILITY	A little bit of 4WD push, but the center one-way really helps to carve those off-power turns.				
BUMP & JUMP HANDLING	The extended wheelbase gets the BC through the bumps with authority, and it jumps flat and true.				
DURABILITY	It's easy to abuse a 4WD buggy, but in our test, there wasn't any damage.				
RADAR TESTED TOP SPEED	33MPH*				
BEST BUYER	Experienced electric off-road racers				

* Top speed varies with equipment used.

SOURCES

AIRTRONICS (714) 978-1895;
airtronics.net

HITEC RCD INC. (858) 748-6948;
hitecrd.com

LRP; distributed by Team Associated
(714) 850-9342; teamassociated.com

REEDY; a division of Team Associated
(714) 850-9342; teamassociated.com

LIKES

- > Excellent parts quality and fit.
- > Stable handling.
- > Smooth drive train.
- > Lots of suspension-geometry options.

DISLIKES

- > Manual supplement could be better organized.
- > No slipper clutch.
- > Motor heat sink not included.

TEST GEAR



LRP Quantum Competition 2

This latest addition to the Quantum line "reads" the load on the motor and adjusts its frequency to match, based on the profile to which you program it. It has five adjustable profiles, programmable drag brake and brake response. And the QC2 doesn't require an external power capacitor, so its mounting area remains small.

Additional items used to complete the Yokomo MR-4BC Special

Hitec RCD HS-925MG
high-speed steering servo

Reedy KR 10x2
hand-wound modified motor

Reedy X-Cell Yokomo
3300 matched cells

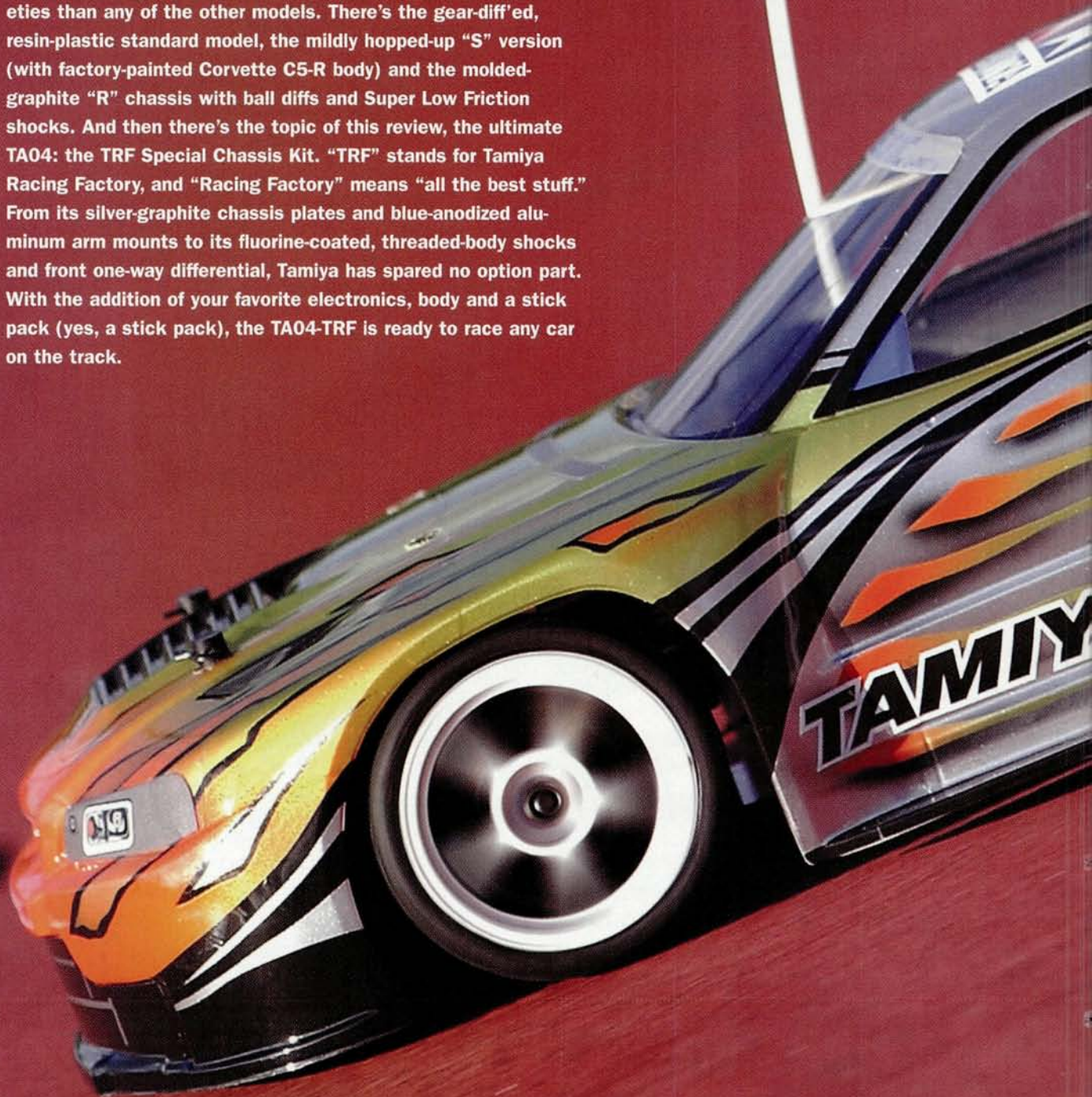


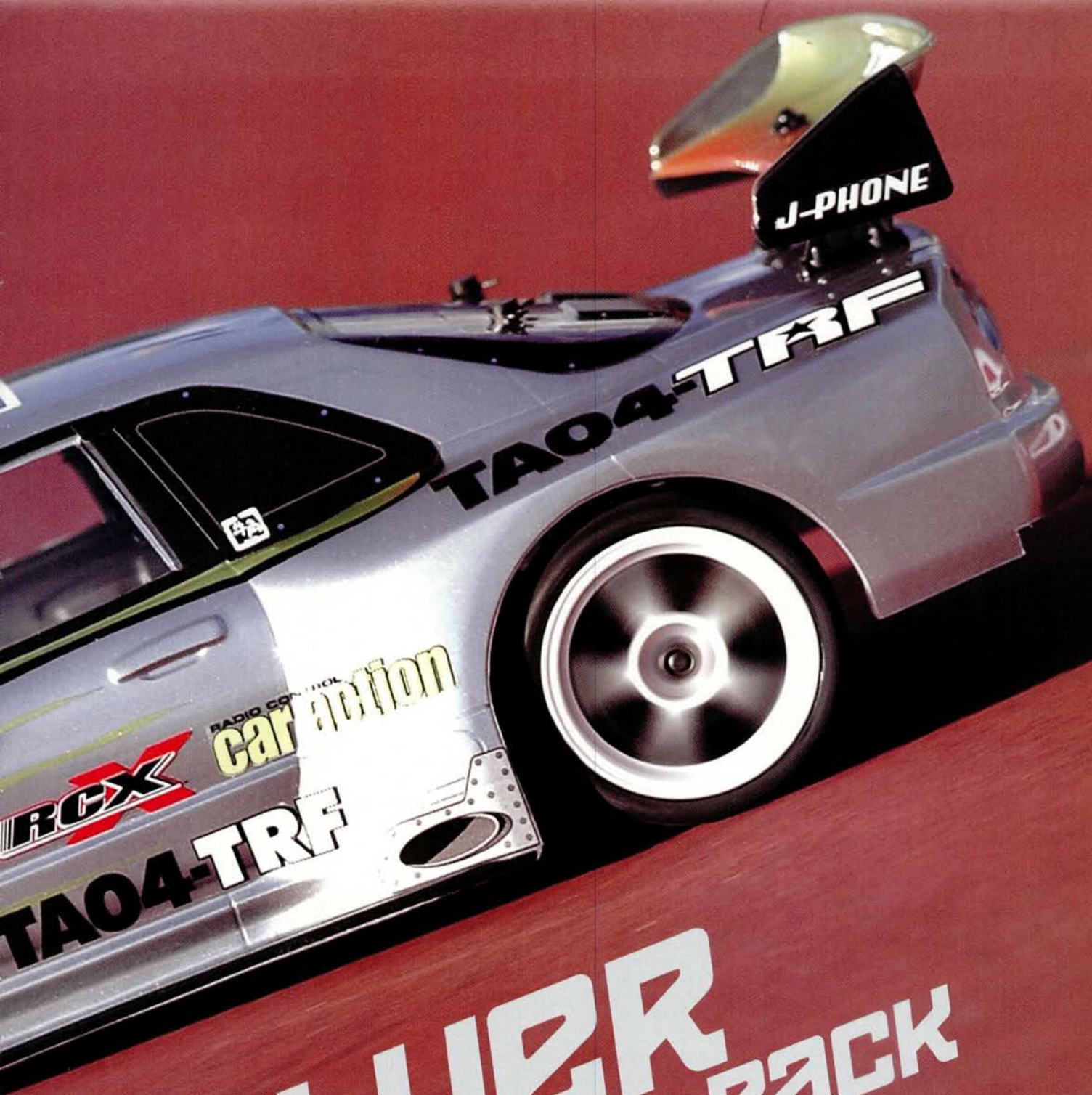
Airtronics M8 transmitter
and 92826 micro receiver



Tamiya TA04-TRF Special Chassis Kit

TAMIYA HAS ALWAYS OFFERED ITS TA-SERIES SEDANS in a variety of trim levels, but the TA04 is available in more varieties than any of the other models. There's the gear-diff'ed, resin-plastic standard model, the mildly hopped-up "S" version (with factory-painted Corvette C5-R body) and the molded-graphite "R" chassis with ball diffs and Super Low Friction shocks. And then there's the topic of this review, the ultimate TA04: the TRF Special Chassis Kit. "TRF" stands for Tamiya Racing Factory, and "Racing Factory" means "all the best stuff." From its silver-graphite chassis plates and blue-anodized aluminum arm mounts to its fluorine-coated, threaded-body shocks and front one-way differential, Tamiya has spared no option part. With the addition of your favorite electronics, body and a stick pack (yes, a stick pack), the TA04-TRF is ready to race any car on the track.





SILVER STICK-PACK SEDAN

KIT FEATURES

CHASSIS. Colored graphite might be the next big thing, but only a few cars are sporting the stuff right now. The TAO4-TRF is one of the few and uses Silver Surface Graphite (SSG) for its upper and lower decks and shock towers. According to the kit box, SSG “brings out more flexibility,” but there’s no difference I could detect. For me, the real benefit is SSG’s lasting looks. Unlike a black graphite finish, the silver stuff doesn’t yellow with age. Surprisingly, the chassis is designed for use with stick packs only. There aren’t any slots for side-by-side cells (as used by the molded-tub TAO4s), and the TRF’s plastic battery holders don’t have enough clearance for a side-by-side pack with end tabs. Blame it on the Japanese Model Racing Car Association, which only allows stick packs in JMRC-sanctioned races.

DRIVE TRAIN. Like all TAO4s, the TRF spins its differentials via a pair of belts arranged in the classic short-rear-belt/long-front-belt configuration. But unlike the other TAO4 models, the TRF’s front differential isn’t really a differential at all: it’s a one-way unit. The one-way bearing is pressed into an aluminum hub, and a standard ball-diff pulley is clamped to the hub with four bolts and an aluminum support ring. When the one-way engages, pulley flex will not be an issue!

The rear differential has special touches of its own. It’s a ball diff (of course), with ten 3mm balls and indexed diff rings. The indexing is a must; without it, the rings would slip on the ultralight plastic outdrives. Plastic outdrives’ slots are prone to spreading under load, so aluminum anti-spread collars are fitted over the outdrives’ ends. A caged thrust bearing is another plus—no microscopic thrust balls running around loose. The diffs mate with universal-joint axles with hardened-steel shafts up front (to cope with high-stress one-way abuse) and lightweight, blue-anodized aluminum shafts in the rear (where loads are less extreme). Aluminum clamping drive hexes cap the axles and won’t be pulled off when you’re changing the wheels.



The front one-way bearing is pressed into a machined, blue-anodized housing that also serves as the hub for the pulley. The rear ball differential sports plastic outdrives with aluminum anti-spread collars.

A 4mm layshaft is the heart of the drive train and holds a pair of aluminum pulleys. The right-side pulley is fixed to the layshaft, but the left-side pulley spins on a one-way bearing. The one-way pulley/one-way front “diff” combo should really let the TAO4-TRF sing on high-bite tracks, but it’s likely to be a handful when grip is low. We’ll see.

A machined-aluminum spur-gear hub hangs off the end of the layshaft and uses an O-ring to center the included 120T, 64-pitch, graphite/plastic spur gear. An SSG plate supports the gear, and Tamiya even supplies a lightweight, fluorine-coated 39T aluminum pinion gear. The fluorine coating reduces friction. This, along with the dual one-ways and ball bearings throughout, makes the TAO4-TRF’s drive train as friction-free as the laws of physics allow. An aluminum motor plate is the finishing touch; it’s finned for cooling and blue-anodized for style.

SUSPENSION AND STEERING. I’m a sucker for superlative shocks, and the TRF’s are arguably the best in RC. We’ve all seen threaded-aluminum shock bodies before, but the TRF’s are fluorine-coated to fight friction. The shock shafts are also coated with the slippery stuff, and the pistons and shaft guides are made of polytetrafluoroethylene (also known as “PTFE”—the stuff that makes Teflon so slick). Bladders backed by urethane

“springs” take care of volume compensation, and even the spring perches are precisely machined pieces of drilled-out aluminum. Awesome. Light, medium and heavy front swaybars are included to help you tune the TRF, and a single rear swaybar is standard.

Graphite-plastic arms squeeze the shocks and are held by aluminum arm mounts. The rear mount suggested by the manual gives each rear wheel 0.5 degree of toe-in, and an alternate block is supplied to set the car with 1 degree of toe-in per side. Droop screws and steel turnbuckles make ride height and camber easy to adjust, and the SSG shock towers have 4 front and 6 rear shock-mounting options.

And the steering? It’s a traditional dual-bellcrank deal with ball-bearing-supported plastic ‘cranks, steel-turnbuckle tie-rods and a 3-spring servo-saver mounted directly on the servo.

BODY, WHEELS & TIRES. You’ll have to supply a body to complete the TRF (I chose a Tamiya Calsonic Nissan with paint courtesy of “Body Shop” author Josh Thiel), but Tamiya does provide race-ready rolling stock. The wheels are aggressive-looking 24mm 6-spokers, the tires are belted slicks in Tamiya’s sticky A-compound, and shaped one-piece urethane inserts support the rubber. They’re definitely keepers, but I traded the stock black wheels for white 5-spoke rollers just to brighten up the action shots.

BUILDING & SETUP TIPS

The TAO4-TRF includes a meticulously illustrated manual with full-size hardware legends and a complete parts list, so it’s a hard kit to goof up. I can add only a few minor tips:

STEPS 2 & 34. Pay attention so you don’t miss the 7x3mm bearings that are installed as pinch rollers in these steps. If you miss the bearing in step 2, you’ll have to tear down the entire rear end to install it.

STEPS 3 & 11. The droop screws fit very tightly in the arms, and that makes them very difficult to turn, even if you grease the threads. There are two fixes: use a 3mm or 1/8-inch drill bit to step the holes so the screws don’t have to pass through the entire thickness of the arm, or substitute 4-40 screws for the 3mm screws provided. I chose the latter, mainly because Kevin had borrowed my drill bits.

STEPS 4, 8, 12 & 14. Put a dab of thread-lock on the shock-mounting screws and universal-joint crosspin screws. They might stay put without thread-lock, but why find out the hard way?

STEP 7. The motor plate blocks the screws that hold the aluminum standoff that’s installed between the rear bulkhead halves, so install the standoff before you bolt up the motor plate.

STEP 10. The instructions say you may need to file the rear suspension arms to prevent the hub carrier from binding on them, but trust me: they will bind. Instead of filing the

arms as shown in the manual, I shaved the hub carriers on a bench grinder. This was faster and easier than trying to remove material between the arms’ hinge-pin bores.

STEP 19. Glue small pads of sheet brass to the chassis where the droop screws will contact it so the screws don’t chew into the graphite and tweak the suspension. That’s an old pan-car trick.

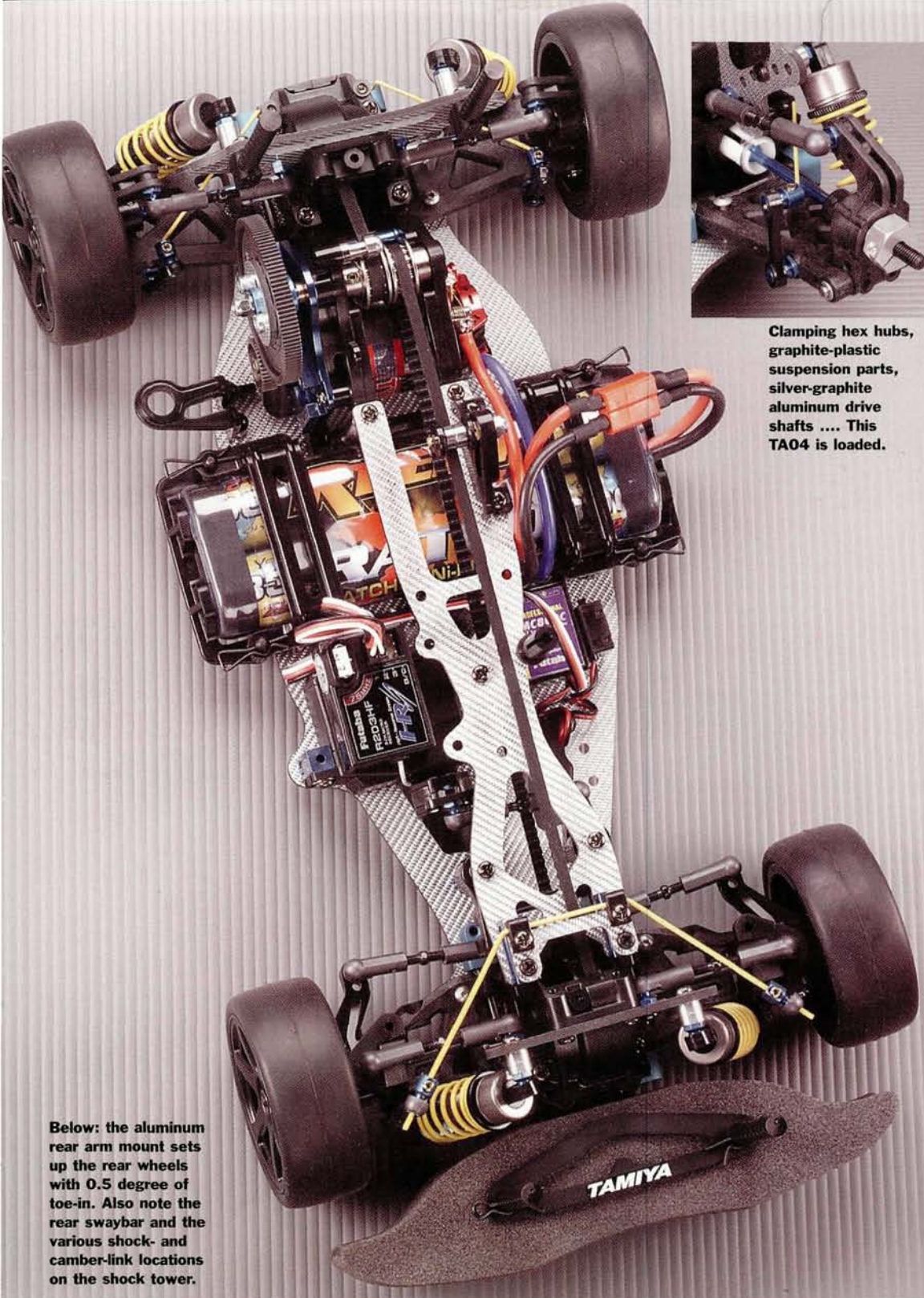
STEP 22. Time to install the front swaybar, but three are included, and the manual doesn’t say which color you should install. The box art shows the yellow “medium” bar, so I went with that.

STEP 32. Tiny, 1.6mm, screws pinch the aluminum hex hubs onto the axles. Don’t overtighten them! As soon as you feel them snug up, stop twisting.

STEP 33. Instead of using naked body clips to hold the foam bumper down, snip the no. 8 bumper stay off parts tree “M,” cut off its mounting legs, and drill it to fit over the body posts to create a much more effective bumper stay.

you’ll need

- Transmitter and receiver
- Electronic speed control
- 6-cell stick pack
- Motor
- Steering servo
- Tire glue
- Body



Below: the aluminum rear arm mount sets up the rear wheels with 0.5 degree of toe-in. Also note the rear swaybar and the various shock- and camber-link locations on the shock tower.



Clamping hex hubs, graphite-plastic suspension parts, silver-graphite aluminum drive shafts This TA04 is loaded.

SPECIFICATIONS

MANUFACTURER Tamiya
MODEL TA04-TRF Special
 Chassis Kit
SCALE 1/10
PRICE \$350

DIMENSIONS

Wheelbase 10 in. (257mm)
Width 7.4 in. (190mm)

WEIGHT

Total, as tested 50.8 oz. (1,442g)

CHASSIS

Type Double-deck plate
Material "Silver Surface" graphite

DRIVE TRAIN

Type Dual-belt 4WD
Primary 120T spur gear/39T pinion
Drive shafts (F/R) Universal joint with hardened-steel shaft/universal with aluminum shaft
Differentials (F/R) One-way/ball type with plastic outdrives
Bearing type Metal-shielded ball bearings

SUSPENSION

Type Lower H-arm with turnbuckle camber link
Shocks Threaded-body fluorine-coated aluminum

WHEELS

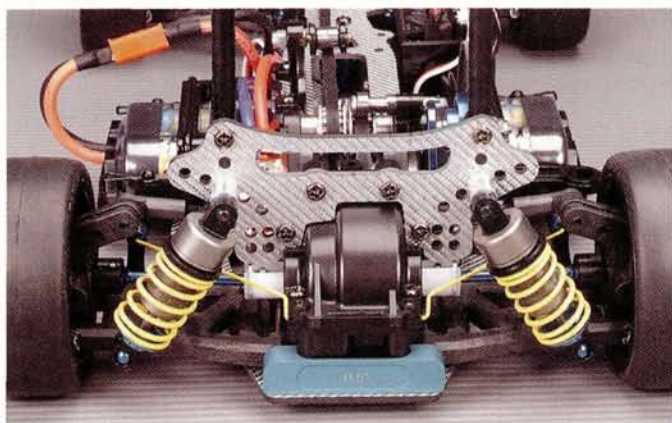
Type One-piece 6-spoke

TIRES

Type Tamiya A-compound belted slick; shaped urethane inserts



Above: the front suspension features capped suspension arms, and the upper kingpins double as ball studs for the turnbuckle camber links. Note the high-rise swaybar; it's more adjustable than the standard TA04 swaybar setup that squeezes the bar between the drive shafts and lower arms.



Left: the blue-anodized, finned motor plate is a nice glam touch that also helps cool the motor. The pinion's dark gray look comes from its friction-fighting fluorine coating.

PERFORMANCE

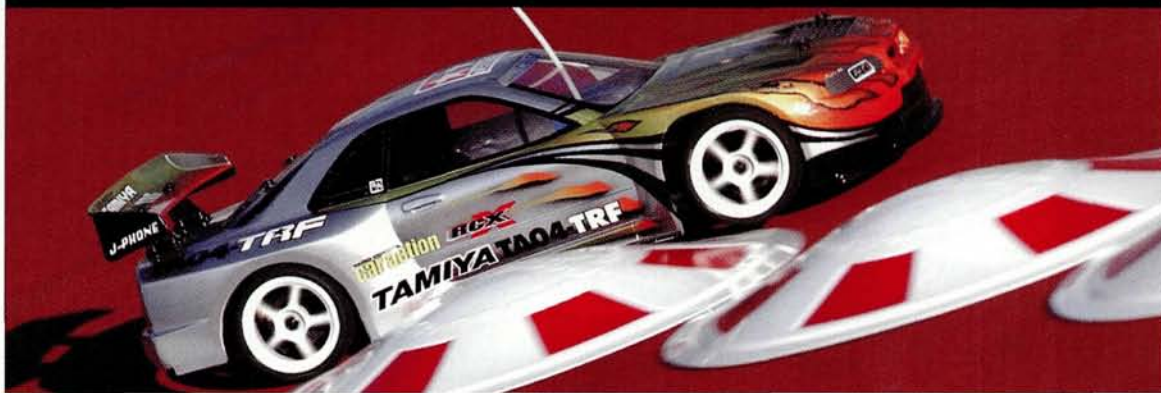
I took the TAO4-TRF to Hobby Chamber in West Haven, CT, for testing. Matt Higgins ran his Reflex 12 there for this issue's "Track Test" and told me it would be a great place for the TAO4; he was right. The track's "grade 12" asphalt surface is pool-table smooth, and a coating of VHT guarantees major grip—just the thing for a touring car with swaybars and a one-way setup. The track's layout is altered about once a month, but you can always count on wide lanes, high-speed straights and plenty of room to pass.

With its dual one-ways, the TAO4 was exceptionally quick and quiet down the track's long back straight, and once the transmitter had been trimmed out, the TAO4 was rock-steady on the wide-open run to the first turn. The sticky, Type-A slicks and swaybars are ideal for high-traction running, and the car dived into turns like a P-51 Mustang peeling off for a strafing run. The steering felt very light and aggressive; very little steering input is required to hustle the TAO4 around the track, and it felt more like a pan car than a tourer as it snicked from turn to turn. The TAO4 rotates so quickly that it felt as if it was on the verge of spinning out, but the grippy track and tires kept it in the groove. My theory is that the oversteer feeling is caused by the stick-pack setup. It concentrates the battery's weight farther aft on the chassis than a saddle-pack arrangement, so the chassis' polar moment of inertia is longer and gives the rear more "swing." This, along with one-ways, helped the TAO4 rail through turns at warp speed. A one-way front end and a one-way pulley can give a sedan a ragged-edge feel when it's pushed hard as the front wheels dig in hard and give the car a yank, but there's no faster setup when traction is up. I pushed the TAO4 as hard as I wanted, and there was plenty of grip left over for modified horsepower.

After putting a few more packs through the car, I noticed the drive train was running even more freely and the belts had picked up an extra millimeter or so of slack—just the usual break-in wear. I did, however, manage to break a front arm when I clipped a board on the next run, which wasn't normal; I've always found TAO4s pretty tough, and it wasn't the first crash of the day. I replaced the arm and haven't broken any arms since then. Apart from that, the TAO4-TRF was as tight as it was when I first put it on the track, and although I gave the boards a few more solid whacks, I didn't break any more arms. My only other concern about durability is the chance of belt damage; if you race outdoors, make sure the track operators keep the track well-swept, since cars with exposed drive belts are prone to having pebble jams. Otherwise, the TRF is as durable as any race car needs to be.

THE VERDICT

It's no surprise that Tamiya's best-equipped TAO4 is pure bliss to build and fast on the track. The TRF's appeal to fans of touring-car exotica in general and Tamiya rides in particular is obvious, and racers should definitely give the car a look. The only sticking point is the stick pack; though it doesn't affect performance (as long as you run a no-loss connector), compatibility with the racing standard of side-by-side cells is a convenience that's tough to give up. But being able to slide in a stick pack is the ultimate in convenience, so if you're willing to convert your battery arsenal, consider the TAO4-TRF to be the ultimate way to get a stick pack around a racetrack in a big hurry.



RATING THE TAMIYA TAO4-TRF SPECIAL CHASSIS KIT

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	As usual, Tamiya's instructions are excellent				
PARTS FIT & FINISH	Nothing goes together like a Tamiya kit, and the TRF was the best build I've had in a while				
CORNERING ABILITY	It's a little edgier than a saddle-pack car or TC3-style chassis, but the TRF is track-ready				
ACCELERATION	There's plenty of grip with the Type A slicks, and the slick belt system can put the power down				
DURABILITY	I broke a suspension arm, but experience has proven the TAO4 is tough				
RADAR TESTED TOP SPEED	27.5MPH*				
BEST BUYER	All Tamiya fans; racers who prefer stick packs				

*As tested with stock motor, speed varies with equipment used

SOURCES

FUTABA distributed by Hobbico/Great Planes Model Distributors, (800) 637-7660; futaba-rc.com.

PRO-LINE RACING (909) 849-9781; pro-lineracing.com.

REEDY, a division of Team Associated, (714) 850-9342; teamassociated.com.

TAMIYA AMERICA (800) 826-4922; tamiyausa.com.

W.S. DEANS CO. (562) 634-9401; wsdeans.com.

LIKES

- > Impeccable Tamiya quality; every piece is a jewel.
- > Exceptionally slick drive train.
- > Best shocks ever.

DISLIKES

- > Accepts only stick packs.
- > Front one-way isn't for all tracks.

TEST GEAR



Tamiya Super Stock Type RR motor

This 27-turn stocker is a far cry from Tamiya's usual silver-can 540. The RR is race-tuned with laydown brushes, polarized heat sinks and a slick, slide-in circuit board that holds the surface-mounted capacitors. Red-anodized end-bell hardware and a black-chromed finish on the can amp up the fashion factor, and, most important, the motor makes plenty of power. RR must stand for "Really Rips."

Additional items used to complete the Tamiya TAO4-TRF:

Futaba 3PK transmitter & HRS receiver

Futaba MC800 ESC

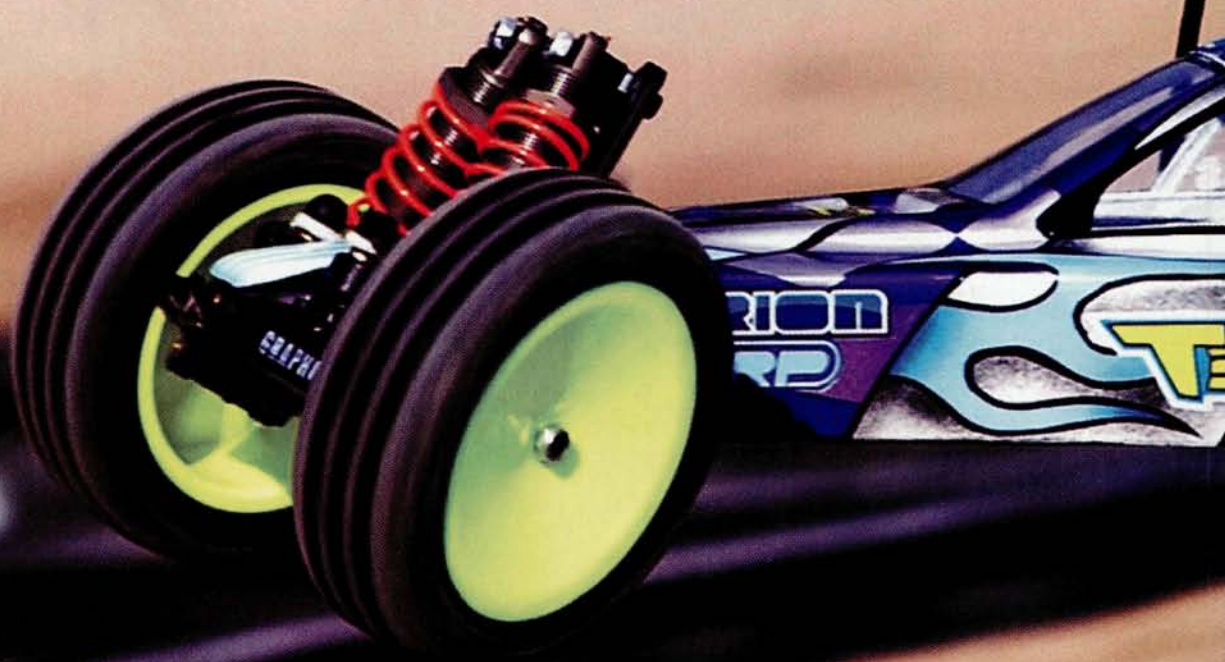
Futaba S9451 digital servo

Reedy X-Rated Yokomo GP3300 matched pack

Deans zero-loss battery connector



Team Losi Triple-X Brian Kinwald Edition 2



the BEST Brian-



buggy yet

WAIT; THAT CAN'T BE RIGHT. HAS IT REALLY BEEN FIVE YEARS since Team Losi introduced the Triple-X buggy? When the third-generation X-car debuted, it was nothing short of an off-road revolution, and it remains fresh to this day, but that hasn't stopped Team Losi from looking for ways to go faster. With the release of the Brian Kinwald Edition 2 version of the groundbreaking buggy, it looks as if the R&D guys have done just that. Just like the original "BK" Triple-X, the "BK2" is loaded with all of Losi's factory options. But there are also some drive-train and suspension tweaks that are much less obvious to the eye but stand to make a big impression on the track. Keep reading, and all will be made clear ...

KIT FEATURES

CHASSIS. Like the Kinwald-edition buggies that precede it, the BK2's chassis is molded of graphite-plastic composite for reduced weight and maximum rigidity. The shape is classic Triple-X with raised sides that increase cornering clearance. Although the main chassis is the same, a new molded front pivot mount, rear pivot plate and aluminum rear pivot mount have been added to accommodate the new VLA (Variable Length Arms) suspension package (more on that later). All the new molded parts as well as the battery strap are made of graphite composite, and since the stuff is slightly conductive, battery-insulation tape is also provided to prevent the cells from shorting on the sills of the chassis' battery tray.

DRIVE TRAIN. The BK2's drive train is all new from the drive axles up. The 3-gear transmission has a smaller differential (46 teeth, compared to the original Triple-X's 51), an aluminum top shaft with integrated 18T top gear and a new and higher internal drive ratio of 2.56:1 for quicker acceleration. The differential has some new internal features too, including a diff-adjusting screw with two thrust-bearing seals to help keep dirt out (the original Triple-X had one seal butted up against the head of the screw), longer outdrives (to reduce binding caused between the dogbones and outdrives) and a stronger square-cross-section diff spring that will endure

much more use before it wears out. The diff's smaller diameter and correspondingly more compact transmission case lower the BK2's center of gravity, but not low enough for Team Losi. To completely slam the CG, the tranny case protrudes through the rear pivot plate and actually hangs about 1mm below the chassis (don't worry; a molded-in skidplate protects the exposed tranny). The smaller diff and lowered tranny also let the motor sit closer to the gearbox, thus reducing the car's polar moment of inertia. According to Team Losi, this greatly improves forward traction and speed on bumpy



The diff screw uses a pair of seals to keep dirt out, and the thrust spring is made of square wire to hold precise adjustments and outlast standard diff springs.

sections of a track. The BK2's dual-pad slipper-clutch will also help out on bumpy and/or slick tracks, and it's the same as the previous Kinwald car with the exception of its spur gear: it's one of Losi's new Kevlar models.

One of the BK2's most significant new features is its management of "friction dynamics," to use Team Losi's term. The BK2's MIP CVDs are significantly shorter and mate with longer diff outdrives. The new geometry reduces the distance the CVD's dogbones move inside the outdrives during suspension articulation ("dogbone plunge" is the term Losi uses). With reduced dogbone plunge, the BK2's suspension travel is smoother and the drag-braking effect of plunge friction is reduced. Speaking of friction reduction—Teflon-shielded ball bearings keep all the spinning stuff spinning smoothly. Say that five times fast.

SUSPENSION AND STEERING. The BK2's key suspension features are its variable length arms. Each suspension arm has two outer hinge pinholes that match a pair of hinge-pin bores in each hub carrier. If you use the outboard hole, you increase the arm's effective length, and vice versa when you use the inboard hole. The BK2's width doesn't change, but the effect on the suspension action can be dramatic. There are new shock and swaybar position options as well, all designed to give the car an aggressive feel. The arms and the rear shock tower are molded graphite; the front tower is

1/8-inch G-10 and proven tough by five years of competition. The Triple-X pioneered the "leading camber link" concept and the use of vertical ball studs for roll-center adjustment, and in "BK" trim, the turnbuckles are titanium. Threaded, hard-anodized shock bodies are also familiar BK touches, but their anodized-aluminum adjusting nuts with O-ring "grabbers" are new to the BK2 (and much easier to twist than the old nylon nuts). Titanium-nitride shock shafts are another classic BK feature, but Team Losi didn't stop at the shafts with the BK2. The hinge pins are also titanium nitride; that's a first. It makes sense; ti-nitride's scuff-resistance and slipperiness are most beneficial to shocks but also important for hinge pins. An aluminum rear pivot block is another new BK2 piece and it steps up the car's durability factor (the style points don't hurt either).



In addition to aluminum preload collars, the BK2 gets a new, aluminum rear hinge-pin bracket. All of the aluminum parts get Losi's tasteful hard-ano'd finish.

BUILDING & SETUP TIPS

Team Losi manuals aren't very showy, but they are among the industry's best, thanks to clear illustrations and ample text support that make for an easy build. Pay close attention to the "Important Notes" given throughout the manual, and even new builders will be able to turn out an A-main-ready buggy. Here are a few extra tips to help:

STEP E-3: Shock-end installation.

Threading the shock ends all the way onto the shock shafts can be a pain when using standard or needle-nose pliers. I found that placing an old shop rag over the shock shaft (so you don't scuff the titanium-nitride coating) and using "channel-locks" to prevent the shaft from slipping works much better when the shock end gets closer to the end of the threads. For bumpy tracks, the Team Losi pro's unscrew the shock ends one or two turns to give the suspension a little more downtravel.

STEP D-14: Slipper-clutch

assembly. The following assembly sequence will make it easier to align the slipper pads and spur gear. First slide the inner slipper plate onto the top shaft. Flip the tranny over so that the top shaft is pointing straight downward, and hold the inner slipper plate with the edge of your thumb so it doesn't slide off. Place the inner slipper pad on the spur gear, and slide the pair up the top shaft to meet the inner slipper plate. Flip the entire assembly back over so the shaft faces upward, and complete the rest of the build with the shaft facing upward.

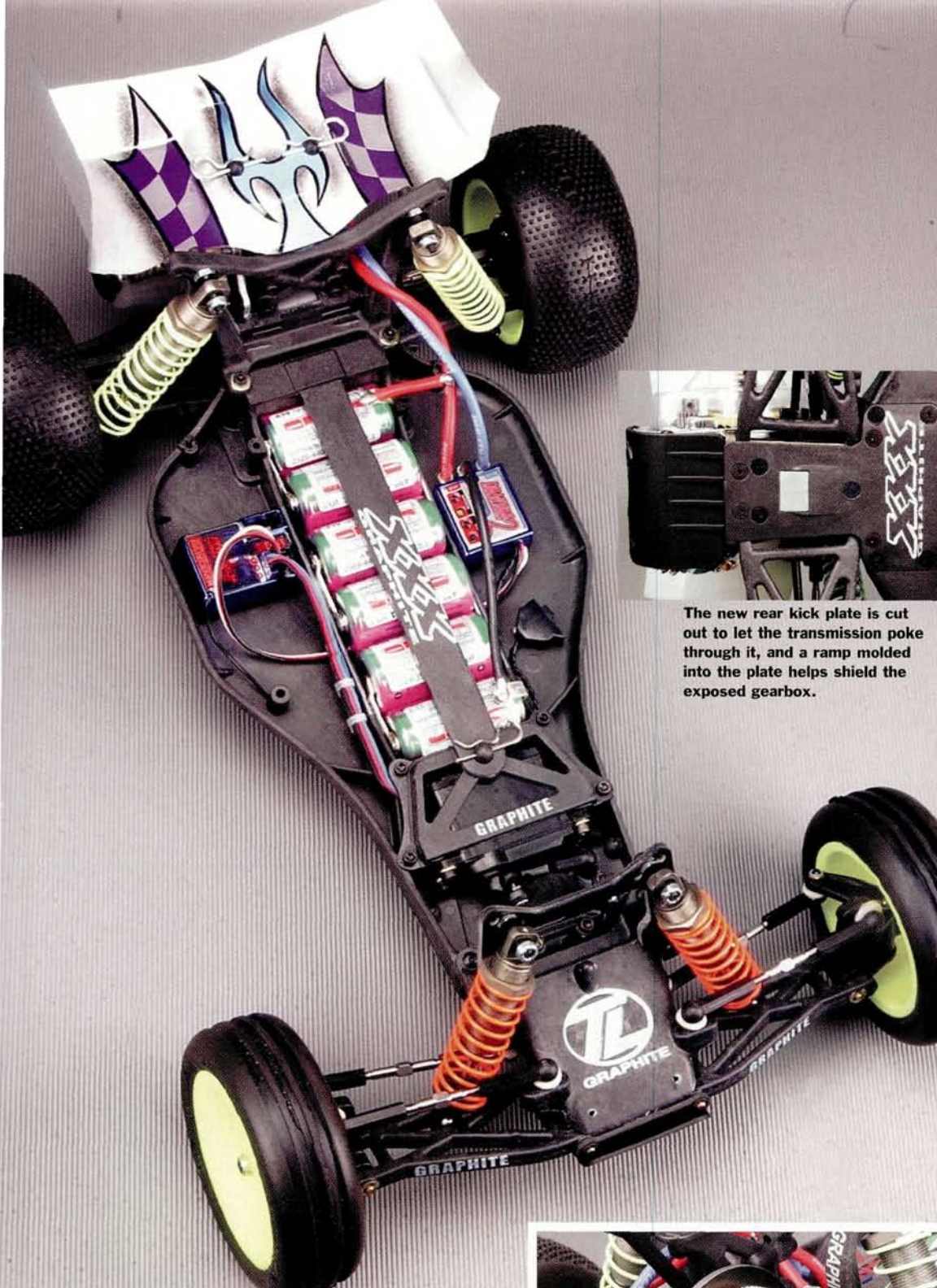
STEP D-16: Motor guard installation.

The 4-40x3/8-inch screws thread directly into the aluminum pivot mount, so it's a good idea to dab them with thread-lock.

BODY MOUNTING. It's easy to slide the body on, but slipping the body clips in can be awkward. Instead of sliding the front clip in laterally while you fight the shock tower, drill the front body mount so that the clip slides in from the front. You can skip the rear body clips entirely by using Velcro strips. Install the Velcro on the chassis first, and then slide the body onto the chassis and mark the position of the matching strips on the body before you peel and stick them. And get real Velcro; the generic stuff never lasts as long.

you'll need

- Transmitter and receiver
- Electronic speed control
- Steering servo
- Motor
- Pinion
- 6-cell battery pack
- Charger
- Tire glue
- Polycarbonate-compatible paint



SPECIFICATIONS

MANUFACTURER Team Losi
MODEL Triple-X Brian Kinwald
 Edition 2
DISTRIBUTED BY Horizon Hobbies

SCALE 1/10
PRICE \$280
Varies with dealer

DIMENSIONS
Wheelbase 10.6 in. (269mm)
Width (F/R) 9.82 in./9.84 in.
 249/250mm

WEIGHT
Total, as tested 54.32 oz.
 (1,540g)

CHASSIS
Type Molded, interlocking semi-tub
Material Graphite composite

DRIVE TRAIN
Type Enclosed 3-gear transmission
Primary 21-tooth pinion/78-tooth spur
Transmission ratio 2.56:1
Drive shafts Steel MIP CVDs
Differential Adjustable ball-type
Bearing type Teflon-shielded ball bearings

SUSPENSION
Type Graphite lower H-arms with titanium turnbuckles
Shocks Hard-anodized, threaded-aluminum body with titanium-nitride shafts and aluminum preload collars

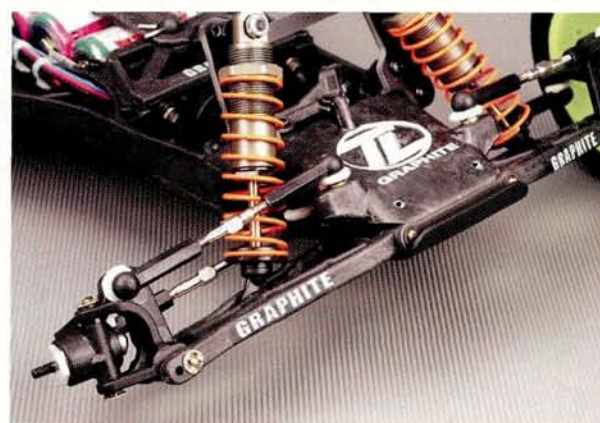
WHEELS
Type One-piece, dish-type

TIRES
Type (F/R) Silver-compound Xtra-Wide/ red-compound X-2000



The new rear kick plate is cut out to let the transmission poke through it, and a ramp molded into the plate helps shield the exposed gearbox.

Below: a Kevlar spur gear is now standard. Less obvious features include a machined motor plate (all the fancy stuff is on the back side), longer outdrives and shorter 'bones' on the MIP CVDs.



Left: full graphite, ti-nitride hinge pins and shock shafts, threaded shock bodies and aluminum preload collars—all standard.

TRACK TEST TEAM LOSI TRIPLE-X BRIAN KINWALD EDITION 2

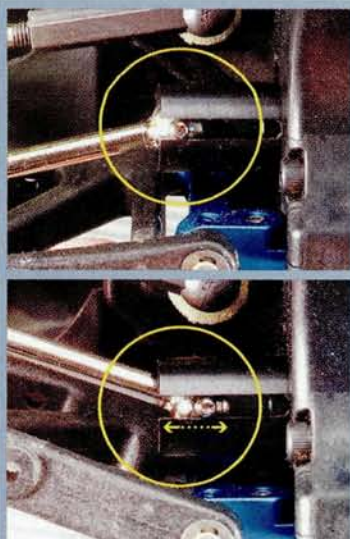
The BK2 uses a dual-bellcrank, ball-bearing steering system with an adjustable servo-saver—all pretty standard stuff, except for the bellcrank pivot post's angle; they're tilted backward to match the angle of the steering arms' kingpins. This removes bump-steer and contributes to the Triple-X's laser-precise steering.

BODY, WHEELS AND TIRES. The BK2's aggressively angular body has a scoop on each side to channel cooling air under the shell, and the wing has some aero tricks as well. Its base curves downward to meet the shock tower to smooth airflow from over the cockpit, and the side dams curve

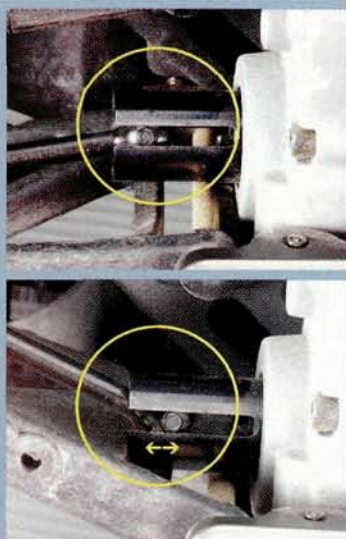
away at their leading edges to help funnel more air over the wing. Like the paint? Bill Zegers of Zegers RC Grafixx laid down the color.

Team Losi has been known for race-winning tires even longer than it's been known for cars, and naturally, the BK2 is shod with Losi rubber: red-compound X-2000 rears and silver-compound Xtra-Wide fronts. Foam inserts are included, and the tires are mounted on standard Triple-X dish wheels. I used Team Losi's Red (thin) tire glue to mount the tires because the applicator tube is easy to use, and the stuff is stickier than a theater floor after a "Finding Nemo" matinee.

inside the BK2



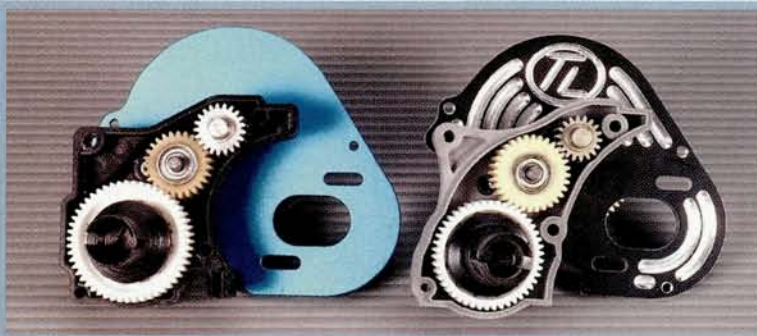
Here's the original Triple-X. Keep your eye on the dogbone pin. As the suspension is compressed, the pin slides into the outdrive; this adds friction to the drive train and suspension.



Take a look at the BK2 in action. Thanks to the longer outdrives, shorter dogbones and new suspension's geometry, the dogbone pin barely plunges at all. This helps the Triple-X suspension and drive train operate more freely than ever.



Here's a look at the new variable length arms (BK2 on the left, original Triple-X on the right). You can reposition the hinge pin to effectively shorten or lengthen the arm without changing the car's width. Along with the additional hinge-pin hole, there are new shock and swerbar position options.



On the left, a standard Triple-X transmission, on the right, the BK2 tranny. Note how much lower the differential sits in the case, and look at its diameter; it has 46 teeth, down from the standard car's 51. This would lower the ratio to a too-tall 2.19:1, but thanks to an 18T top shaft gear, the BK2 tranny spins a 2.56:1 ratio.

RATING THE TEAM LOSI TRIPLE-X BRIAN KINWALD EDITION 2

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	Excellent manual provides detailed illustrations, comprehensive instructions, a complete parts list and tuning tips.				
PARTS FIT & FINISH	I barely lifted the X-Acto throughout the build.				
ACCELERATION	The BK2 accelerates extremely well. However much power your motor can muster will make it to the track.				
CORNERING ABILITY	Whether powering through sweepers or checking up for slow 180s, the BK2 carves with the best of them.				
BUMP & JUMP HANDLING	The buggy jumped well but really shone through the rough stuff.				
DURABILITY	The titanium turnbuckles and anodized-aluminum rear hinge-pin mount make the BK2 practically indestructible.				
RADAR TESTED TOP SPEED	37.1MPH*				
BEST BUYER	Any electric off-road racer.				

* Top speed varies with equipment used.

LIKES

- > VLA suspension increases tuning options and gives a super-stable ride.
- > New transmission spools up quickly to maximize motor power.
- > Every factory go-fast part is in the box.

DISLIKES

- > Rear body mounts are difficult to access.

TEST GEAR



Team Orion VMAX Plus-RDS cells

Team Orion's new high-voltage cells created quite a buzz on website chat forums because of their off-the-charts voltage numbers and noticeable punch. In addition to the usual zapping, voltage-enhancing and matching, the cells get Orion's Race Discharge System (RDS) treatment, which uses variable amp draw during the discharge process to simulate real-world power demands. I gave the RDS cells a whirl in my BK2, and they're some of the nastiest I've run. If you can buck up for these high-dollars cells, you won't regret it because they are well worth it!

Additional items used to complete the Team Losi Triple-X BK2

Team Orion Jukka Steenari Edition Revolution 12x2 modified motor



Airtronics 94452 steering servo

LRP Phaser Competition receiver

LRP Quantum Competition 2 ESC



Team Losi 21-tooth pinion gear

Team Losi red (thin) tire glue

JR Racing XS3 Radio



PERFORMANCE

I tested the BK2 at my home track—Hot Rod Hobbies in Saugus, CA. I've raced buggies for years at Hot Rods, so I had a deep file of track impressions with other buggies to compare with the BK2. The track has an abrasive hard-packed clay surface, and it's loaded with technical jumps and the turns flow pretty well—exactly the type of track the BK2 was built for. The hot setup at the track is to run red-compound Team Losi BK Bars in the rear, so I was a little skeptical about how the buggy would perform with the provided red X-2000s. After a couple of warmup laps, I pushed the car as fast as I could and found that it was pulling more stick out of the X-2000s than I would expect from my BK1. The BK2 also felt more stable through the rough sections. I would tense up, expecting the car to at least get a little out of shape, but it would just blast through with barely a wiggle. Buggies can feel nervous and edgy, but the BK2 had truck-like stability and grip (there must be something to that dogbone plunge and VLA suspension stuff). It was also quick from corner to corner, and that speaks mostly to the power of the Orion V2 motor I installed. But no car feels fast unless the transmission can do its thing efficiently, and the BK2's gearbox does: it sounds pan-car quiet and spools up instantly.

Track time improves lap times, and after I put a few packs through the car, I was able to carve consistent lines on the asphalt-like surface. I ran the battery forward, as suggested by the manual, and that gave the slight on-power push expected of 2WD vehicles in general and buggies in particular. I could have done some tuning to get more mid-corner bite, but I left the front end alone because the push wasn't something that really bothered me. Initial steering response was good with quick turn-in, and the predictable, mellow understeer made it easier to push the car without feeling uncomfortably close to the limits of rear traction. If you enter a corner too hot, you'll lose a lot less time slowing to reduce understeer than getting marshalled for a spinout.

After a full day of running the BK2, I was thoroughly impressed by it, especially the rear end changes. I don't believe X-2000s would have worked nearly as well with the original Triple-X geometry. In all, the BK2 simply felt better than the original Kinwald Triple-X in all areas of performance except jumping. Don't get me wrong; it jumps great with a neutral midair attitude and appropriate sensitivity to throttle input—but so did the "old" Kinwald car.

THE VERDICT

Who would have guessed there was more performance to be squeezed out of the Triple-X, especially when there's already a loaded Kinwald version? With the BK2, Team Losi has put an even sharper edge on the already deadly track slicer. The VLA suspension increases tunability, the low-CG transmission helps it hug the track even more tightly, and the new drive-shaft geometry puts more power on the ground. And it's a huge bargain when you consider the cost of adding the upgrades to a "standard" Triple-X (if you can even find one; the standard model was discontinued with the introduction of the first Kinwald Edition Triple-X). For only about \$60 more than the cost of the old base model, you get exactly the same hardware Brian Kinwald and the rest of the Losi pro's race at the toughest events in the world. Think of the BK2 as a factory ride without the hassle of traveling the national circuit, living out of a suitcase and bunking with Richard Trujillo.



SOURCES

AIRTRONICS (714) 978-1895; airtronics.net

HORIZON HOBBY INC. (800) 338-4639; horizonhobby.com

JR RACING distributed by Horizon Hobby (217) 355-9511; horizonhobby.com

LRP distributed by Team Associated (714) 850-9342;

teamassociated.com.

TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.

TEAM ORION INC. (714) 694-2812; team-orion.com.

ZEGERS R/C GRAFFIXX, (561) 988-5411.

“V” for Victory?

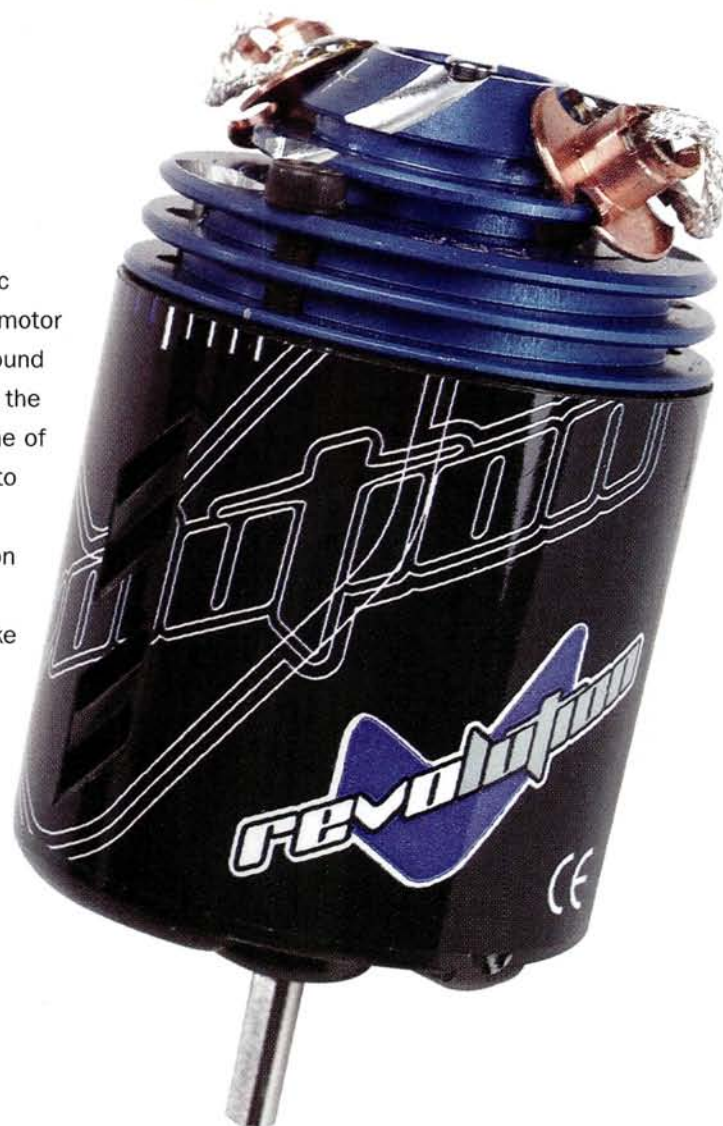
Orion Revolution V2 Modified by Steve Pond

Orion is one of the few major players in the competition electric motor market that actually makes its own motors. Many other motor companies simply finish the assembly by wrapping the wire around the armature and balancing and packaging, etc., but Orion has the can, armature and endbell made to its specifications. Being one of such an elite group of manufacturers gives Orion the freedom to be particularly creative and innovative with its motor designs. The latest proof of this comes in the form of the new Revolution Modified motors. They are 540 mills and legal for all forms of racing, but they sport a radical new endbell design that isn't like anything ever before strapped to the top of an RC car motor.

REVOLUTION MODIFIED

The Revolution Modifieds are Orion's newest premium racing motors. They replace the Core series as Orion's best hand-wound modifieds, and they will power Team Orion's drivers in competitions around the world in the upcoming season.

The lineup includes a diverse selection of winds, and there are four motor series: Modified, Steenari, Touring and Hara. The Steenari and Hara motors are named after world-champion drivers Jukka Steenari and Atsushi Hara. Each series is slightly tweaked to have subtle performance-characteristics differences from the others, so they aren't merely re-stickered motors.



FEATURES

- > New aluminum endbell design
- > Angled brush orientation
- > Pure copper brush tubes
- > Round brushes and brush springs
- > Factory-installed capacitors



The thickness of the armature's webbing varies according to series. The armature is centered in the can using O-rings; this is supposed to reduce vibration and make the motor run more smoothly.



The wire on Team Orion armatures is pattern-wound—a process by which the wire is neatly wrapped in a “pyramid” pattern. This reportedly produces more uniform lengths of wire on each pole, so the armature requires less balancing.

MOTOR CAN. The motor can is the same as the Core motor's. It features a matte-black finish and four, big vents in the bottom that extend to the outside, so they'll allow a cooling airflow even when the can is mounted on a flat surface. Four angled vents are punched into each side of the can, and they allow a little breathing between the magnets. The Revolution is fitted with Orion's “G14” wet magnet, which the company says is its strongest magnet to date.

The motor label has timing marks to help you correctly dial in the timing after regular motor maintenance or a rebuild, but the spacing of the timing marks is a little awkward. Each mark equals about 5.75 degrees of timing—just shy of 23 degrees for the whole scale. The marks are more for reference than for measuring actual degrees of timing; 20 degrees is about halfway between the last two marks, and that's a good place to start with any motor that has more than 9 turns.



The Revolution has a conventional 2-magnet can with the latest Orion G14 wet-pressed magnets—its strongest magnets, according to Orion.

ARMATURE. This looks like standard mod-motor issue: it has a solid web and a full crown on the laminations. The Revolution motors have armatures with webbing of varying thicknesses to fine-tune performance; motors with thicker armature webbing produce more rpm; motors with thinner webbing produce more torque. The Modified line has a thicker webbing for better 2WD off-road performance, while the Touring, Hara and Steenari lines have thinner webs for more punch on the high-traction conditions of 4wd off-road and touring car racing.



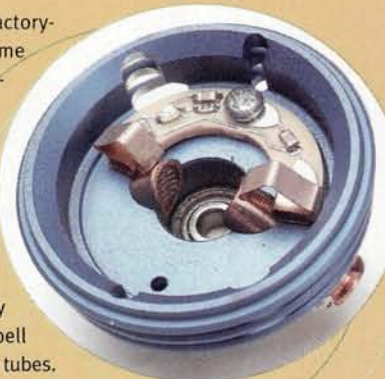
> **ENDBELL.** This is pretty different from anything we've seen so far. We've seen aluminum endbells before, but the V2's design and features are unique. The brush hoods

are pure copper tubes, and they're installed in the endbell at an angle. This means that the round brushes contact the commutator at an angle. Brushes installed like this resist the “brush bouncing” that we see with standard brushes that are installed at 90 degrees to the commutator. As a result, the brush springs don't have to be as strong, so less power is lost to friction caused by the contact between the brush and commutator.

The copper brush tubes are installed in the endbell without insulation, and that keeps brush temps lower than in a conventional motor.

Finally, the angle of the brush tubes ensures a larger contact surface area than with a conventional motor, so the Revolution motors benefit from a large contact area with a smaller brush.

Orion was the first to bring us factory-installed capacitors in its Chrome motors, but they had only two capacitors and not the three that are recommended. The new Revolution endbell has three surface-mounted capacitors on its underside. Only the wires from the speed control have to be soldered to the motor. A few words of caution related to soldering the motor wires: you need a particularly hot iron because the aluminum endbell draws a lot of heat from the brush tubes. This benefits performance, but it increases the risk of your having a “cold” solder joint that harms performance, and it may result in the motor leads coming off



Three surface-mounted capacitors are soldered to a circuit board mounted on the endbell's underside; note the angle of the brush tubes.

it. It's a great “problem” to have because it means that the brushes will be very cool during operation, but you absolutely must make a good solder joint when you install the motor.



Unique round brushes have serrated faces to shorten break-in time. Even though the brushes are smaller than conventional rectangular brushes, their contact area is about the same because they're cut at an angle.

BRUSHES. The Revolution motors' highly innovative brushes are round instead of rectangular. Orion says that this "... allows smoother brush overlap, resulting in less arcing, which increases performance and reduces the likelihood of radio interference." They're smaller than conventional brushes, but they're installed at about a 45-degree angle and that creates a contact area that's about as large as that of a standard brush. The brushes are inserted into the brush tubes from the inside of the endbell. The brush tubes extend well inside the endbell so there's very little gap between them and the commutator. This leaves less room for the brushes to vibrate.

The brushes are serrated and are available in two compounds: Enduro and Sprint. The Enduro is popular in modified touring and off-road where amp draw is highest, and the Sprint brush has a higher silver content for increased performance, but it's harder on the commutator; it's best for when you just need max power.

The Revolution motors come with a pair of brushes installed, and there are two more pairs in the box.

> Available brushes: item nos. 41090—Enduro; 41091—Sprint

BRUSH SPRINGS. Coiled springs are used with the round brushes. Orion claims that the springs are made of Inox steel, which is highly resistant to heat and so will perform consistently well in hot and cold conditions. Orion also says that because they avoid heat-related fatigue, the springs last longer. They're formed with "unequal-length coils" to reduce vibration.

> Available springs: 41390 (soft), 41391 (medium), 41392 (medium hard), 41393 (hard).

DYNO TESTING

I tested two of the Revolution Modified motors—10- and 12-turn singles—on our Robitronic Pro-Master dyno. The dyno is set to the standard 7.5 volts to simulate a 6-cell battery pack; we run each motor several times, allowing sufficient time between tests to allow each one to cool between runs.

Both motors ran flawlessly every time I tested them. A dyno test is pretty rough treatment for a motor because it goes from a dead stop to full punch and is held at full throttle until it reaches its peak rpm. At high rpm, I usually see blips or inconsistencies in the curves because the brushes bounce—not so with these motors. Each laid down a nice, smooth curve and didn't falter in any tests.

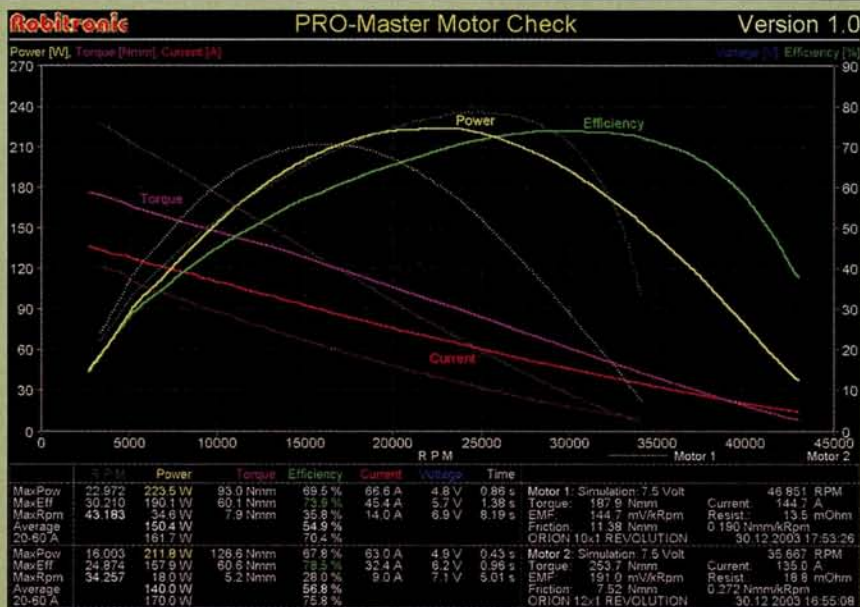
The Revolution motors produced numbers that are similar to the Core motors'. We tested a Core 10x2 a little over a year ago; the Revolution motors produce similar peak power, a shade less torque and a little more rpm.

Wind: 10-turn and 12-turn single

Brushes: round, serrated, single-shunt

Springs: medium-hard are standard

Commutator diameter: 0.297 in. (7.54mm)



The motors we tested are 10- and 12-turn Revolution V2s from Orion's Modified series. This means they have the thickest web for more controlled, off-road low-speed punch. Compared with a Core 10-turn, the Revolution Modified 10-turn comes out of the hole with about 20 percent less torque. This makes it easier to control off the line and coming out of tight corners, and, starting at about its midrange and going all the way up to peak rpm, it makes more horsepower than earlier motors.

TRACK TESTS

We strapped the motors into a couple of touring cars and headed to our local indoor track, determined to put at least a dozen runs on each motor. Diehard modified racers who don't lack for funds cut their commutators after about every four runs. That gives them a good day of racing (three qualifiers and a Main) before they have to go back inside the motor to freshen things up. Some racers do this more frequently and others, less often. But racers rarely put a dozen runs on a motor without doing a little maintenance.

After a dozen runs, we pulled out the motors and removed their endbells. It's slightly annoying that you can't inspect the brushes or get a good look at the comm without removing the endbell. Chances are, you

would have to remove the endbell eventually, but you have to get used to the idea that you can't just flip a brush spring and pull the brush for inspection as you can with a regular motor. The vent in the endbell's positive side allows a decent view of the comm, so this isn't as much of an issue, but conventional endbells allow a clear, unobstructed view of the comm.

The Revolution motors meet Orion's claim that its brushes wear less than a conventional motor's—at least, in our tests. Both motors came away from a dozen runs with brushes and comms that looked as if they had just a few runs on them. The comms had far fewer pits and much less carbon buildup than can develop pretty quickly in highly strung modifieds.

10-TURN MOTOR

DYNO TEST RESULTS

Peak rpm: 43,183
Peak power (watts): 223.5
Peak torque (Nmm): 187.9
Torque C peak power (Nmm): 93
Peak efficiency: 73.9%

12-TURN MOTOR

DYNO TEST RESULTS

Peak rpm: 34,257
Peak power (watts): 211.8
Peak torque (Nmm): 253.7
Torque C peak power (Nmm): 126.6
Peak efficiency: 78.5%

AVAILABLE WINDS

Here are the numbers for the Steenari, Hara, Touring and Modified winds. Although some models are offered with identical winds, Orion uses different armatures for each of the motors in this series.

HT = high torque
HS = high speed

MODIFIED	STEENARI	TOURING	HARA
29000, 6x1	29040, 6x1	29020, 10x1	29060, 6x1
29001, 6x2	29041, 7x1	29021, 10x2	29061, 7x1
29003, 7x1	29042, 8x2	29022, 11x1	29062, 8x1
29004, 7x2	29043, 9x2	29023, 11x2	29063, 9x1
29006, 8x1	29044, 10x1	29024, 12x1 HS	29064, 10x1
29007, 8x2	29045, 10x2	29025, 12x1 HT	29065, 12x1HT
29009, 9x1	29046, 11x2	29026, 12x2	29066, 12x1HS
29010, 9x2	29047, 12x1 HT	29027, 13x1	29067, 12x2
29012, 10x1	29048, 12x1 HS	29028, 13x2	29068, 13x1
29013, 10x2	—	29029, 14x1	29069, 14x1
29015, 11x1	—	29030, 14x2	—
29016, 11x2	—	29031, 15x2	—
29017, 11x3	—	29032, 16x2	—
29018, 12x1	—	—	—

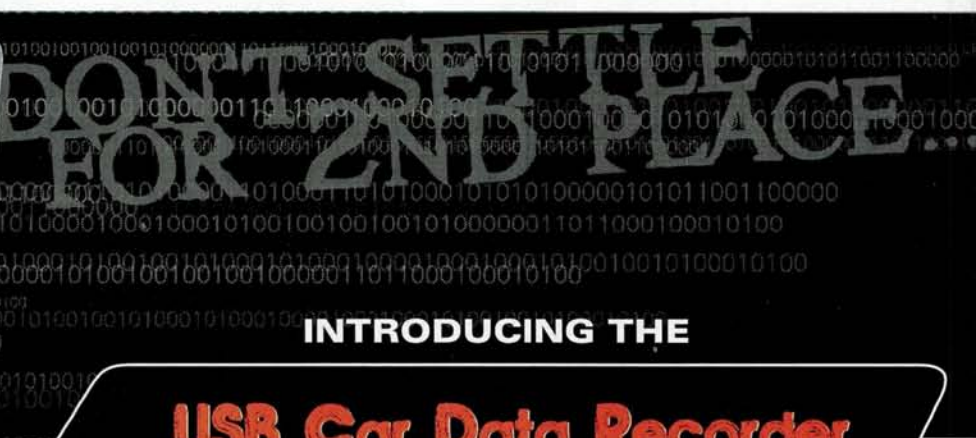
THE VERDICT

The Revolution 10- and 12-turn Modifieds did very well in the ideal conditions of the test lab, but these motors weren't designed to give great dyno; they are designed to perform on the track. I saw only a hint of the Revolutions' real benefits while dyno-testing them: smooth power curves and hardly any brush bounce.

On the track, however, these motors proved to be very capable. In a touring car on a high-bite track, the punch coming out of the corners is a little soft, but the Modified Revolution is designed to deliver soft punch. It has a thicker armature web than the more punchy Touring, Hara and Steenari motors. They both pulled very well however, from the mid-range up. The only glitch was that a

brush spring popped out of the top of one of the brush tubes during track testing, but I tucked it back in, and it stayed put. I'm also struggling with the limited brush access. I'm used to quick and easy access, and not having it will take some getting used to (you have to remove the endbell for brush maintenance).

Our testing shows that the Revolution motors can deliver strong performance on the test bench and even stronger on the track. The new endbell design is excellent at keeping the comm and brushes cool, which really starts to pay off during the extended run time of an actual race and more so over the course of many races. It's definitely a promising development in the evolution of the Revolution. ■

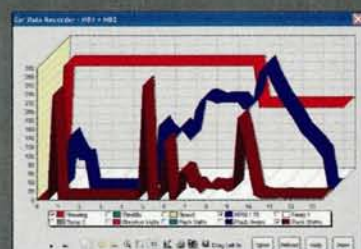


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howto

10

nitro tips

Photos by Pete Hall

Nitro know-how

by the RC Car Action team

Who doesn't love a good tip—or better yet—10 great ones? Since most of the questions we get are about nitro power, and fuel-burning machines account for most of the latest vehicle releases and continue to grow in popularity, we thought it was high time for a collection of classic nitro tips. Go ahead, use 'em all and make people think you actually know what you're doing!



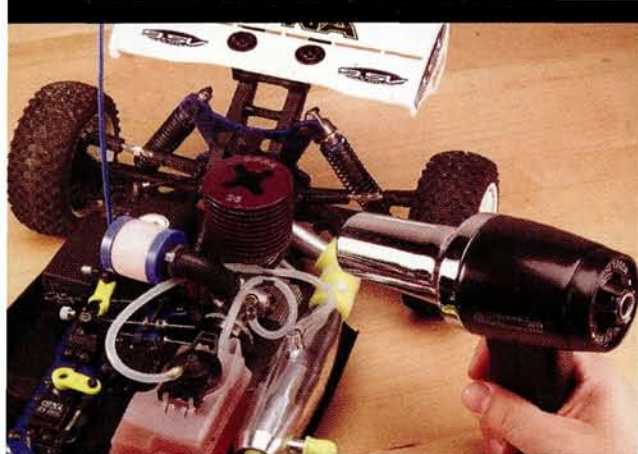
Tilt, squeeze, release
and repeat until your
fuel bottle is full.

1



FILL THAT FUEL BOTTLE RIGHT!

We're constantly amazed by how many otherwise intelligent RC guys fill their fuel bottles by pulling out the filler neck and dumping fuel in through the open top. It's messy, it's a pain, and it wears the seal between the filler neck and the bottle. Real nitro guys squeeze the bottle, dip the filler neck into the fuel and then release the bottle so it sucks the fuel up into the neck and into the bottle. No funnel required.



This hair dryer on steroids can be a big help when starting a tight engine.



A body-clip ripcord is your thumbnails' best friend.

2 YOU CAN'T BEAT HEAT

If your engine is hard to start because the piston is super tight at top dead center, reach for a heat gun. This handy heater-upper may look like a hair dryer, but it's far more powerful. Aim it at your engine until the case is good and warm, and you should be able to fire it up much more easily because the internal parts will have warmed up to a temperature that's closer to their operating-temperature specs.

3 GET A HANDLE ON IT

Ow! Ever given yourself the body-clip-under-the-fingernail torture as you tried to pry off heavy-duty 1/8-scale body clips? Show your tender digits some mercy by putting little grab handles on there. A zip-tie loop will do, but that looks totally weak. Instead, use two zip-ties and a piece of fuel tubing—color-coordinated to match your paint job, of course.



Your filters won't filter much unless you lube 'em.



4 BAG IT

Stop neglecting your air filter. That, in and of itself, is a mighty good tip. But here's the real tip: use a Ziploc bag to lube the filters and store them. Put a dollop of filter goo in the bag and use it to saturate the filters without getting your fingers all sticky. Leave your spare filters in there so they'll be ready to go when you need 'em, protected all the while from toolbox debris. Go for the thick freezer-style bags; they last longer.



A little squirt, and dirt doesn't stick. Oh, WD-40, what can't you do?

5 WD-40 IS YOUR FRIEND ...

... of course, you already know that since all guys are genetically programmed to appreciate duct tape, superglue and good ol' WD. But did you know it can keep your car clean? 'Tis true. When your car is completely clean, hose it down with WD-40. You can use a compressor to blow off the excess, or just let it drip dry. Your car's plastic parts will once again have that "fresh from the polybag" gloss, and dirt and mud will have a much harder time clinging during your next run. Plus, all the hinge pins and pivot balls will be lubed and ready for action!



Don't let your clutch bearings turn into time bombs! Oil them!

6

LUBE 'EM OR LOSE 'EM

Clutch bearings spin very fast and are subjected to heavy loads, yet they're the smallest bearings in your nitro machine. If you don't treat them right, they'll detonate and cause your engine to stall when you hit the brakes. For maximum clutch-bearing life, clean and lube the bearings after each day of use. If you race, lubing the bearings after every heat isn't too much.



Before: lots of air.



After: hardly any.

7

THE BIG SQUEEZE

As your gallon jug of juice empties, give it a squeeze before you cap it off. The less air you trap with the fuel, the better. And while you're at it, don't forget to install the neck plug under the cap. You threw the plug away? Well, don't do that next time. But for now, put a piece of plastic wrap over the neck of the jug, and then screw the cap over it.

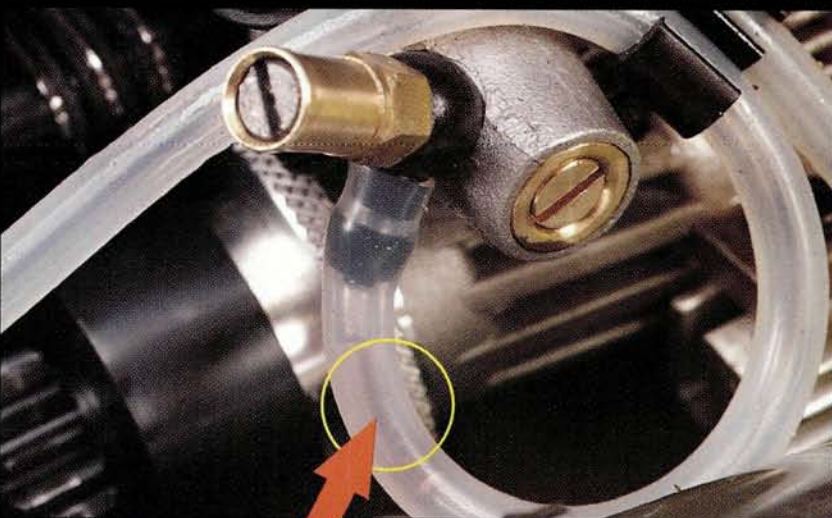


8

GLOW PLUGS: RINSE BEFORE REMOVAL

An open glow-plug hole is a disaster waiting to happen. If you get dirt and crud in there, your piston and sleeve are toast. And what collects around the glow plug in copious amounts? You got it—dirt and crud. Before you remove the glow plug, splash the area around the glow plug with fuel to rinse away any junk you don't want to enter the engine.

Crud around the glow plug means crud in your engine.



9

MAKE SURE THE FUEL SYSTEM IS REALLY EMPTY.

The oily residue left behind when fuel evaporates isn't good for anything except clogging filters and fouling carbs. To get every drop of fuel out of the fuel system, run the tank dry or dump the fuel out through the cap. Remove the fuel line and blow out any droplets that are left in it. If you dumped the fuel out through the tank's cap, fire up the engine, and then burn off any fuel left in the carb.

See that fuel in the line? It's a headache waiting to happen.



10

POST-RUN DRIP JOB

Hopefully, you already know to drip some after-run oil into your engine's glow-plug hole when you've finished running for the day to keep the piston and sleeve happy (you can use RC-specific stuff or good ol' Marvel Mystery Oil). But what about the crankshaft? A drop or two in the carburetor opening will lube the shaft, prevent corrosion and extend engine life. ■

A drop in the cylinder, a drop in the carb, give the flywheel a spin, and your engine is safe.

Six Generations of Serious Horsepower

Trinity D6

by Steve Pond



D6 MODIFIED

Trinity's D-series racing motors started with the D1—better known as the "Dirtinator" and named after world champion driver Brian Kinwald. Though originally developed for off-road, the D-series motors have been evolved to suit vehicles in every class of electric racing.

Each generation of the D motor has its own "personality" and excels in a certain racing class; but that's typical of all motors. This D6 includes a few new performance features, so we strapped it to our dyno to see exactly what it brings to the table.

The D-series racing motors are at the top of Trinity's motor line. The important distinction that makes these Trinity's best motors is the extra tuning and technology and the high-quality materials used into their construction; they may look similar to other motors, but the details distinguish them. D-series motors are used in high-stakes electric competitions at national and world-champion levels, so these are the motors that will give you the most horsepower.

FEATURES

- > Large copper brush hoods for increased efficiency.
- > All capacitors are factory installed.
- > Double-shunt, large, serrated brushes.
- > Polarized, color-coded brush-shunt heat sinks.
- > Skewed armature laminations.
- > Split-magnet design uses four smaller magnets instead of two.



The D6's endbell has copper brush hoods for superior electrical efficiency. Large, polarized, brush-hood heat sinks help to keep the brushes cool.

ENDBELL. Relatively big brush-hood heat sinks distinguish the D6's endbell. The heat sinks are "polarized," which is a fancy way of saying that a black one is installed in the negative side of the endbell and a red one in the positive side. This makes it easier to identify the proper side of the endbell, which is useful when you solder the leads from your speed control to the motor. The heat sinks extend past the top of the brush hood; this interferes slightly with the installation and removal of the brush springs. The brush hoods and primary heat sinks are copper, so they're electrically more efficient than the aluminum ones commonly used. Copper is a little softer and easier to bend than aluminum, so you may have to straighten out the wire tabs if another car nails you in the endbell.

A printed circuit board sits atop the endbell and has three installed capacitors. The capacitors are recommended by most ESC and radio manufacturers to prevent interference, but the D6 comes with them already installed.



The D6's split magnets soften low-speed punch and increase peak rpm. This makes power more manageable on low- to medium-bite tracks.

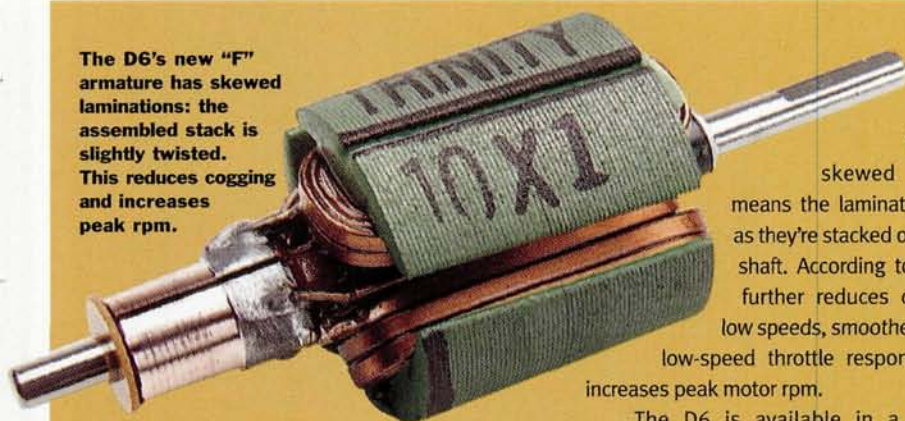


The vents in the bottom of the motor increase the flow of cooling air.

MOTOR CAN. A greenish platinum finish coats the D6's can; apart from that, it looks the same as the D5's. There are two small vents on each side of the can plus eight vents in the bottom. The vents in the bottom extend all the way to the can's outside diameter, so even though the motor is mounted on a flat surface, the bottom vents can still "breathe."

Inside the can is where the D6 differs from any previous "D" mill. It has split magnets, so instead of two big magnets, there are four smaller ones. Split magnets were first used in slot cars and then introduced to modern RC mills by Reedy Modifieds; they reduce cogging and increase peak rpm more effectively than two magnets. The D-6's split magnets are positioned similarly to how they would be installed in the two-magnet setup, but thin shims separate the magnets.

The D6's new "F" armature has skewed laminations: the assembled stack is slightly twisted. This reduces cogging and increases peak rpm.

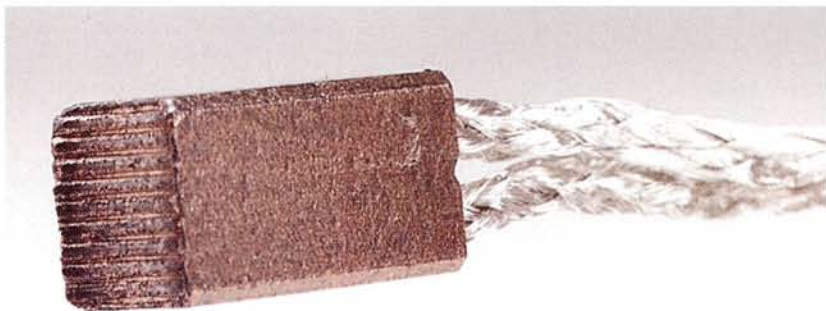


ARMATURE. The new "F" armature with a full web and crown has skewed laminations; this means the laminations twist slightly as they're stacked on the armature shaft. According to Trinity, this further reduces cogging at low speeds, smooths out the low-speed throttle response and increases peak motor rpm.

The D6 is available in a wide variety of winds, but most notable is the flat-wire wind. Most other major brands of motor have round armature wire. Flat wire was first used in the Trinity D5 Flatliner motor, and according to Trinity, the flat wire "... saturates the armature laminations to a greater degree than is possible with round wire. The result is a more powerful, more efficient armature than one with the same number of turns of round wire." The result is a flat-wire 10-turn motor that runs like a 9-turn round-wire motor. The flat wire is stacked more closely to the armature, and that makes it easier for the motor to spool up quickly.

Flat wire can be wrapped more compactly around an armature than round wire can. This means that less wire is needed; this reduces armature mass, and that improves acceleration and peak power (compared with a round-wire motor).





The double-shunt P-94 brushes are slightly wider than standard brushes. To increase power, these are designed to have the perfect amount of wrap around the commutator.

BRUSHES. The D6 brushes were originally developed for the P-94 motor. They're just a hair taller and quite a bit wider than a standard brush. It was determined that these larger brushes provide the ideal contact area on a commutator of standard size. The P-94 brush cross-section is about 25 percent larger than on a standard brush. The larger brush contact area spreads the current that flows through the motor across a larger area; this is more efficient and reduces brush and comm wear. The double-shunt brushes also help to carry more current than a single-shunt brush.

AVAILABLE BRUSHES

- > RC4379E: high silver content; best for 4-cell applications.
- > RC4380E: hard copper; good for low-turn motors and long comm life.
- > RC4383E: silver; most power for 6-cell applications.

BRUSH SPRINGS. The D6 uses Trinity's conventional purple brush springs; they are classified as "heavy" and are one step below the "extra-heavy" silver springs. They rest in a slot cut between the two brush shunts and firmly press the brushes against the comm.

AVAILABLE SPRINGS

- > RC4032: blue, light
- > RC4028: green, medium
- > RC4389: red, medium-heavy
- > RC4033: purple, heavy
- > RC4036: silver, extra-heavy

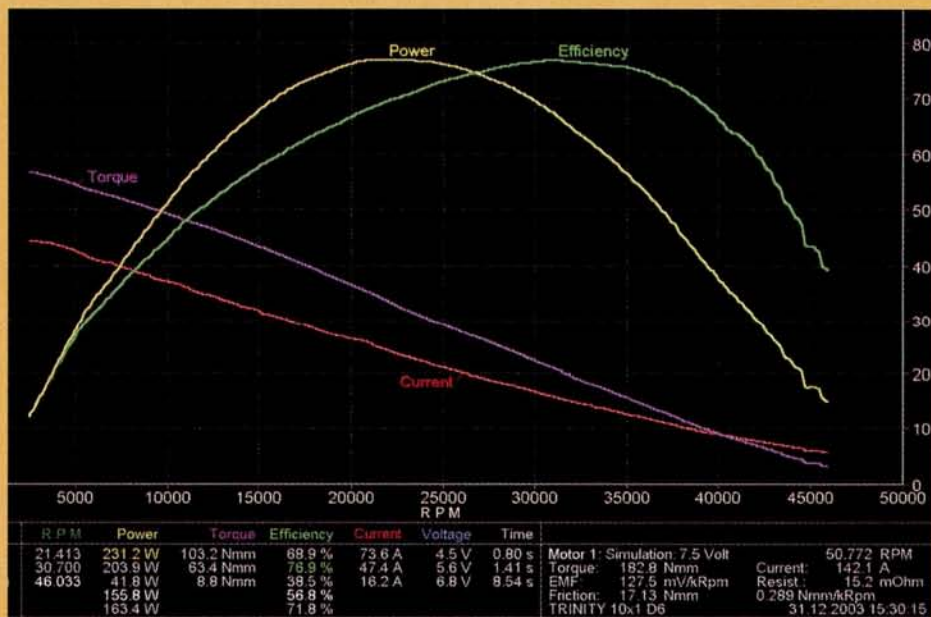
Purple springs are included with the 10-turn D6, and optional springs are available for those who want to do some fine-tuning.



DYNO TESTING

I tested the D6 Modified 10X1 motor on our Robitronic Pro-Master, which is set to the standard 7.5 volts to simulate a 6-cell battery pack. I then made a series of runs, allowing time between tests to give the motor ample time to cool down.

The D6 puts out some strong numbers, and peak power registered at a little more than 231 watts. This is about 5 percent less than our most powerful 10-turn motor, but the real story is how the power is delivered. The split magnets and skewed armature laminations are designed to increase peak rpm and reduce torque. The result is a motor that has better control at lower speeds in low- to medium-traction conditions yet still has the top speed of a low-turn motor. Peak torque is 182.8 Nmm, and at peak horsepower, it registers 103.2 Nmm of torque. Go back a couple of generations in the D-series, and you'll find motors that peak at 50 points higher, but in recent years, the trend has been toward lower torque and higher rpm, and the D6 is no exception.



DYNO TEST RESULTS

Peak rpm: 46,033
Peak power (watts): 231.2
Peak torque (Nmm): 182.8
Torque C peak power (Nmm): 103.2
Peak efficiency: 76.9%

The D6 has good torque for a low-turn modified. It peaks at 182.8 Nmm and settles to 103.2 Nmm at peak power. But big torque numbers are not what this motor is about. The 10-turn D6's real strength is its screaming-high rpm; it cranks out higher rpm than most of the 9-turns we've tested, peaking at around 46,000rpm. It even fares well in comparison with a couple of the 8-turn motors we've tested.

Wind: 10 turns of flat wire

Brushes: serrated, double-shunt

Springs: purple, 180-degree

Commutator diameter: 0.297 in. (7.54mm)

AVAILABLE WINDS

The D6 is available in both flat and round-wire versions, including 12T Euro-spec models. Listed below are the part numbers and wind configurations of all motors in the D6 line.

FLAT-WIRE SINGLE	FLAT-WIRE DOUBLE	ROUND-WIRE SINGLE	ROUND-WIRE DOUBLE	ROUND-WIRE TRIPLE
TRI10000, 6X1	TRI10012, 6X2	TRI10021, 6X1	TRI10027, 6X2	TRI10044, 12X3 BT*
TRI10001, 7X1	TRI10013, 7X2	TRI10022, 7X1	TRI10028, 7X2	TRI10045, 12X3 TT*
TRI10002, 8X1	TRI10014, 8X2	TRI10023, 8X1	TRI10029, 8X2	
TRI10003, 9X1	TRI10015, 9X2	TRI10024, 9X1	TRI10030, 9X2	
TRI10004, 10X1	TRI10016, 10X2	TRI10025, 10X1	TRI10031, 10X2	
TRI10005, 11X1	TRI10017, 11X2	TRI10026, 11X1	TRI10032, 11X2	
TRI10006, 12X1	TRI10018, 12X2	TRI10040, 12X1 BT	TRI10042, 12X2 BT	
TRI10007, 13X1		TRI10041, 12X1 TT	TRI10043, 12X2 TT	
TRI10008, 14X1		TRI10046, 13X1	TRI10047, 13X2	

*BT = Big Track, more rpm

*TT = Tight Track, more torque

THE VERDICT

The D6 launches very smoothly for a 10-turn motor. It still comes off the line and out of the slow corners with as much power as you can handle, but the loss of the often uncontrollable low-speed surge typical of less refined motors is a welcome change.

The D6's characteristics are well suited to low- to medium-grip track surfaces such as those used for 2WD off-road buggy and stadium truck and oval and outdoor touring (when the track isn't cleaned and prepped to increase traction). Too much torque in these situations can make any vehicle more difficult to control, so the manageable punch of the D6 will be welcome.

The top-speed performance of this 10-turn D6 is scorching; similar to that of a regular 8-turn motor. With a peak of just over 46,000rpm, it has some serious legs. It will get you down any long straightaway with pretty impressive speed; the difference is that the rear of the car won't be wiggling along the first half of it.

SOURCES

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

ROBITRONIC; robitronic.com.

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howto build a bump box

Get the holeshot every time by George M. Gonzalez

One of the oldest tricks in electric racing is to give the battery pack one last bump-charge and keep the batteries connected to the charger until the last possible moment. Unfortunately, most race directors don't allow drivers or mechanics to drag a bunch of extension cords over the track to power their chargers so they can give their batteries one last blast of juice.

The solution is to build a "bump box," which is a portable, battery-operated charger that can blast your car's batteries while it's staged on the grid. The extra jolt increases voltage for a super-fast start off the line. Sound like the hot setup for this Sunday? Here's how to build and use a bump box of your own.



you'll need

- DC-compatible charger
- Two 6-cell stick packs or 10 to 12 loose sub-C cells.
- 12- or 14-gauge wire
- Soldering iron and solder
- Double-sided tape
- Mounting platform (optional)

selecting a charger

You will need a DC-powered, peak-detecting battery charger that operates on a 12 to 14V power supply. Be sure to choose a charger that is easy to operate because you won't have time to surf through a bunch of menus and charge parameters when the race is going to start in 30 seconds or less. A charger with a simple dial that adjusts the amp rate and start button is preferred. Most racers bump-charge their battery packs at a high amp rate (8 to 10 amps) to heat up the cells quickly, so a charger with a high charge rate is preferred.

1 MOUNTING PLATFORM

You'll need a 1/4-inch-thick (or slightly thicker) sheet of plastic, plywood or particleboard to use as a platform to mount the charger and power supply batteries. Some racers just tape the batteries directly to the charger, but that looks hack. You want the mounting platform just large enough to mount the charger and battery packs because the bump box should be as light as possible. I used the particleboard back from an old clipboard; it was easy to cut and cheap. Trial-fit the charger and batteries on the platform so you'll know where everything has to go.

I used an old clipboard as a base, but you can also use 1/4-inch plywood, Masonite, Kydex plastic ... anything.



To power the bump box, use a pair of battery packs wired in series. Alternatively, you can solder 10 cells into a single pack.

2 WIRE THE CELLS IN SERIES

Place the two battery packs side by side. To connect two battery packs in series, all you need is a short piece of 12- or 14-gauge wire. Solder one end of the wire to the negative tab on the first battery pack and the other end of the wire to the positive tab on the second battery pack. Solder a battery bar on the positive and negative end cells so you can attach the charger's alligator clips. I used some old 2400mAh Ni-Cd packs; the 12 cells will deliver 14.4 volts. If you use loose cells, you can get away with just 10. They will deliver 12 volts; that's the minimum for DC-powered chargers.

3 MOUNT THE CHARGER

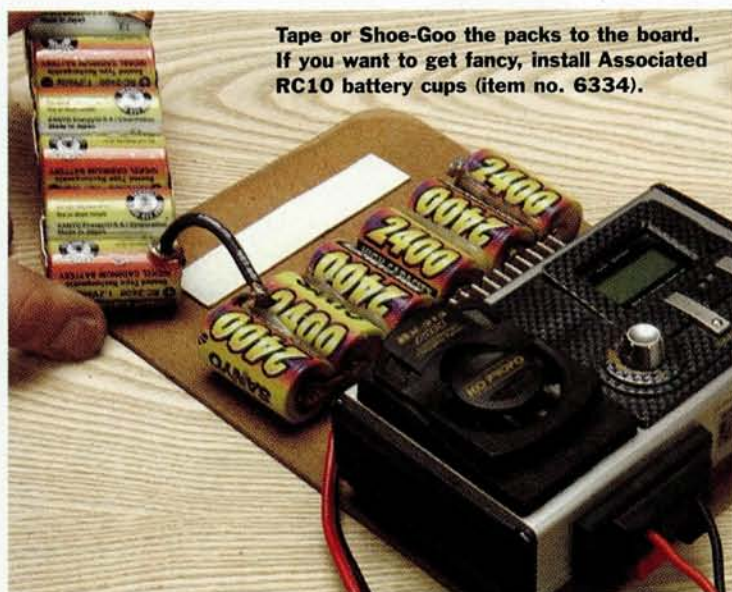
Use double-sided tape or Shoe-Goo to secure the charger to the platform. Install it as shown in the photo so the charger's leads exit through the front of the platform, and the power supply's leads exit from the rear. I used a KO Propo BX-213 charger because it's compact, lightweight and easy to operate.

If your charger is lightweight, you can use heavy-duty Velcro (get the real stuff) instead of double-sided tape or Shoe-Goo to mount the charger. That way, you can easily remove the charger when it isn't needed for bump-box mode.

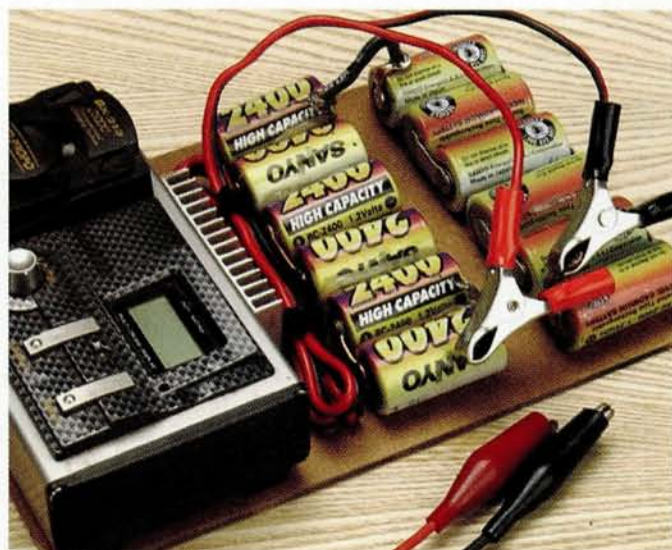


4 MOUNT THE BATTERY PACKS

Use double-sided tape or Shoe-Goo to install the batteries on the platform. If you use Shoe-Goo, set the bump box aside for approximately one hour while the glue sets.



Tape or Shoe-Goo the packs to the board. If you want to get fancy, install Associated RC10 battery cups (item no. 6334).



5 BUNDLE THE WIRES

Use zip-ties to bundle the excess wire. Leave the main charge leads long so they can reach the batteries with the body installed.

Bundle the wires neatly so you don't tangle yourself or your car while using the bump box.



6 CHARGE THE POWER-SUPPLY'S BATTERY PACKS

If your charger has AC capability (or if you have a separate power supply that plugs into a wall socket), use the bump-box charger to charge the power-supply's battery packs. The packs can only power the charger for about a minute, so make sure that they're fully charged before "bumping."

Fully charge the bump-box packs before each use. Here, the bump-box charger powers the packs with help from a separate 12V power supply.

HOW TO USE YOUR BUMP BOX

Using a bump box is easy, but follow these safety precautions so you don't damage your vehicle's electronics or over-charge the battery pack. Make sure your pitman follows these steps while you stand ready on the drivers' stand.



- » Turn off the ESC before you connect the battery charger. Connecting a charger with the ESC turned on can damage the car's electronics.
- » Connect the charger's alligator clips to the battery pack's negative and positive battery bars and start the charge process. Most racers set the amp rate between 8 to 10 amps to yield quick results.
- » Have your pitman monitor the cells so he can disconnect the charger if the batteries start to get overly hot—anything more than "toasty warm" is too hot. When the "10 seconds to the start of the race" announcement is made, your pit guy should disconnect the charger, switch the ESC back on and get off the track in a hurry.

SOURCES

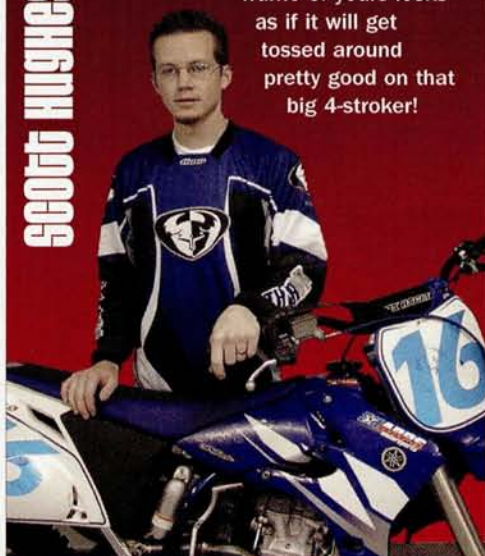
KO PROPO USA INC. (310) 532-9355; kopropo.co.uk.

BY THE RC CAR ACTION TEAM

SCOTT HUGHES OFF-ROADIN' AGAIN

Scott Hughes was considered one of the nation's fastest off-road racers when he raced for Team Associated and Pro-Line. Marriage, school and a marketing career at Pro-Line have kept him too busy to race, but Scott is now back on the track—the motocross track, that is. Scott recently followed in the footsteps of fellow Pro-Line guy Mark Pavidis and went out and got a new Yamaha YZ450F dirt bike. Scott, all we ask is that you stay safe. That buck-fifty

frame of yours looks as if it will get tossed around pretty good on that big 4-stroker!



SITE SEEING



<http://www.speedace.info/>

We all know battery-powered RC cars can top 100mph, but would you believe 257mph in a full-size, battery-powered Bonneville salt flats sled? That's the record set by the Ohio State University Bonneville Bullet team, and you can find out more about the Bullet (and other electric speed-record setters) at the Speed Race site.

BOARD WALK

FROM THE
RADIOCONTROLZONE
.COM BULLETIN BOARD

Lithium-polymer batteries

CRAPS: Rumor has it that electric vehicles will use Li-poly batteries that are the same size as a 6-cell pack but weigh 5 ounces less and have run times around 20 minutes.

K SW31: Some cells have burst into flame, but I've heard that it doesn't happen often. It also seems that the cells aren't as durable. I know that they cost big bucks and require special chargers.

COTHARYUS: I think most of the fire problems have been with lithium-ion cells. Most of the durability problems with Li-polys have to do with charging—hence, the high cost of the chargers.

Slide carb vs. rotary carb

SPEEDBALLTRIX: What are the pro's and cons? **SLOBBATECH:** Setting and keeping the linkage right on a slide carb is more difficult than with a rotary carb. Some say rotary carbs can give a smoother bottom-end feel and throttle response.

TC3RACER: Slide carbs are more sensitive and respond faster than rotary carbs. Rotary carbs are usually easier to maintain.

Carbide vs. diamond lathe bits

TIMMERICA: What's the difference between carbide and diamond lathe bits? **MAFIARACER:** Diamond bits cost a lot, but you get more for your buck. They last a lot longer and give very consistent cuts.

GRIZZBOBB: Diamond bits don't cut any better than carbide, but they last SO much longer that they more than make up for the difference in price.

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TRAVIS AMEZCUA JOINS TEAM LOSI

Electric off-road specialist Travis Amezcua is back with his old teammates and is racing for Team Losi again. Travis will power his cars with Team Orion cells and the new Revolution motors. He is best known for his flashy style, wild hairstyles and a hat you wouldn't want to sit on. Oh, yeah ... and for winning races! His edgy driving should be a good fit with Team Losi.



MINI-Ts TO RACE HOT ROD SHOOTOUT

Several tracks across the country now run Team Losi's popular Mini-T in their regular racing programs because of the micro truck's inexpensive price and off-road prowess. If you can make it to Southern California in July '04 to the annual Hot Rod Hobbies Off-Road Shootout, you will have the chance to compete against dozens of other Mini-T owners in an Unlimited class. According to race officials, the event will feature an exhibition Mini-T class with Team Losi pro drivers.

THE DRAKE WINS AGAIN

Adam Drake was able to keep it together for the long Main to win the ROAR Region 12 nitro truck championship. The Drake and his Novarossi CX12R2N-powered and Trinity-fueled Losi Triple-XNT beat other SoCal pro's Chad Bradley (Mugen), Marty Korn (Team Associated/GS Racing) and Dean Sexton (Mugen) to win the annual race at KZ Speedway in Sun Valley, CA.



“He must look like a shop rag in the mouth of a Doberman on that big 450.”
Thunder Tiger pro (and talented motocross rider) Richard Saxton imagining Scott Hughes on his Yamaha thumper.



FUTABA S3050 digital metal gear servo

Futaba's new S3050 is a heavy-duty digital servo with a more affordable price. It comes with durable metal gears in place of plastic gears for added reliability, and its digital technology gives the servo a performance advantage over a standard analog servo. The S3050 is ideal for a wide variety of high-stress applications, including Maxx-esque trucks, 1/8-scale buggies and 1/10-scale off-road trucks. The servo weighs only 1.6 ounces, has a torque rating of 90.2 oz.-in. and a transit speed of 0.16 second (60 degrees).

Futaba S3050 digital metal gear servo—\$3050; \$50.

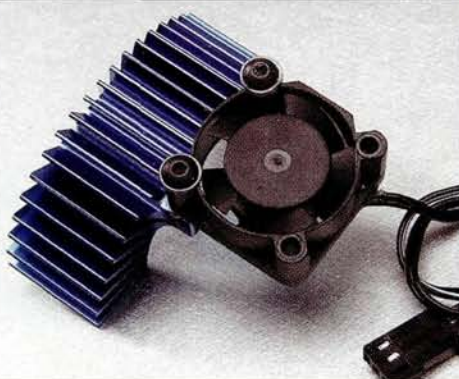
Futaba; distributed exclusively by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; futaba-rc.com.

RPM Nitro TC3 front bumper

RPM's new NTC3 front bumper has been specifically designed to absorb impacts from front-end collisions with its three, built-in buffer zones. These buffer zones give slightly during an impact, and that significantly reduces the energy transferred to the rest of the car. According to RPM, no other material (carbon fiber, aluminum, Kydex) has the memory capability that its nylon does, and RPM says the bumper will return to its original shape after even the biggest of crashes. RPM also guarantees that its bumpers will not break! The bumpers are available in black and blue. [Note: to use this bumper on the RTR Nitro TC3, you'll need Team Associated item nos. 2226 and 2232 for it to fit properly.]

RPM Nitro TC3 front bumper—80272 (black)/80275 (blue); \$11.

RPM R/C Products (909) 393-0366; rpmrcproducts.com.



REEDY Clip-on motor heat-sink with cooling fan

New from Reedy is this cool (no pun intended) clip-on heat sink that has a built-in cooling fan. The fan plugs into your receiver's third channel and draws less than 1/3 amp. When clipped into place, the fan sits directly over the motor's endbell—perfect for extremely hot track conditions.

Reedy clip-on motor heat sink with cooling fan—447; \$30.

Reedy, a division of Team Associated (714) 850-9342; teamassociated.com.

TEAM ASSOCIATED Lightweight B4 & T4 milled motor plate

This new lightweight motor plate is as functional as it is good-looking. It's lighter than stock (which all racers appreciate), but the way it has been machined also helps the cooling air get to the motor. You simply can't beat a lightweight piece that also helps keep the motor cool!

Team Associated lightweight B4/T4 milled motor plate—1770

(blue)/1778 (black); \$15.

Team Associated (714) 850-9342; teamassociated.com.



TEAM ORION Jukka Steenari and Atsushi Hara Pro Edition Revolution V2 motors

Two of the fastest off-road and on-road racers in the world today are Jukka Steenari and Atsushi Hara. Now, each racer has his own Pro Edition motor thanks to their sponsor, Team Orion. These Pro Edition Revolution V2 motors come in a variety of winds and are done up in each driver's color scheme (which looks damn trick, if you ask us).

For those who aren't familiar with the Revolution V2, it has such features as: an angled brush orientation for reduced brush bounce; cylindrical brushes that allow smoother brush overlap; a precision CNC aluminum endbell that provides additional cooling to extend the life of the motor's components; direct soldering reduces resistance to give more power and longer run times; an inboard capacitor system with LED reduces the possibility of radio interference; and the motor comes with an intelligent anti-vibration spring system.

Team Orion Jukka Steenari and Atsushi Hara Pro Edition motors—check with your local Orion dealer for item numbers; \$60.

Team Orion Inc. (714) 694-2812; team-orion.com.

TRACK THREADS

TEAM LOSI IFMAR World Championship hat

Through the years, Team Losi has given a special hat to the drivers from around the world who compete with Team Losi cars in the IFMAR World Championships. (With Cavaleri's win in 4WD, that makes it five years in a row that they've won a title.) This year, Team Losi is offering that hat to the public. It features the Team Losi racing logo embroidered on the front, the "TL" icon on the back and "IFMAR Worlds '03" on the side. It's available in small/medium and large/x-large sizes. Supplies are limited, so act fast!

Team Losi Worlds Hat—

LOSP042SM/LOSP042LXL; \$20.

Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.



UNDER THE HOOD

Mike Blackstock's Team Associated Factory Team TC3

EQUIPMENT USED

Transmitter: KO Propo EX-10 Helios

Receiver: KO Propo KR-297FZ

Servo: KO Propo PDS-2143FET

ESC: Novak GT-7 (prototype)

Battery: Reedy X-Cell 3300

Motor: Reedy KR 8-turn double

Tires: Jaco

Tire sauce: Paragon

Body: Protoform Alfa Romeo 2.1

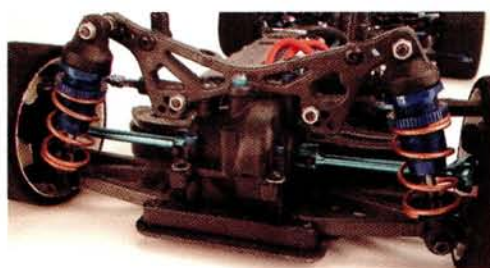
Gearing: 26:100, 26T/100T

SETUP	FRONT	REAR
Caster/anti-squat	4 deg.	2 deg.
Camber	2 deg.	2 deg.
Toe-in/out*	0 deg.	1.5 deg. in
Ride height	4.5mm	5mm
Ackerman	Silver ball end/0.080-in. washer	-
Kick-up	1 deg. negative	-
Bump-steer	0.030-in. washer under ball stud	-
Swaybar	0.055 in.	None
Droop-gauge	5	4 (RR) 3.25 (LR)
Shock fluid	70WT	50WT
Shock piston	3	3
Shock spring	Purple	Copper
Shock limiters	None	None
Shock-tower mount	Inside hole front	Outside hole rear
Arm-mount position	Inside hole	Outside hole
Camber-link position	Upper outside hole on tower	Upper inside hole on tower
Tires	Jaco Double pink/Orange	Jaco Double pink
Wheelbase	Short	-
Battery placement	Front	-
One-way	No	-

*Team Losi zero-degree rear hub carriers with a 0.030-in. washer under the silver ball stud

FACTORY AND AFTERMARKET OPTIONS

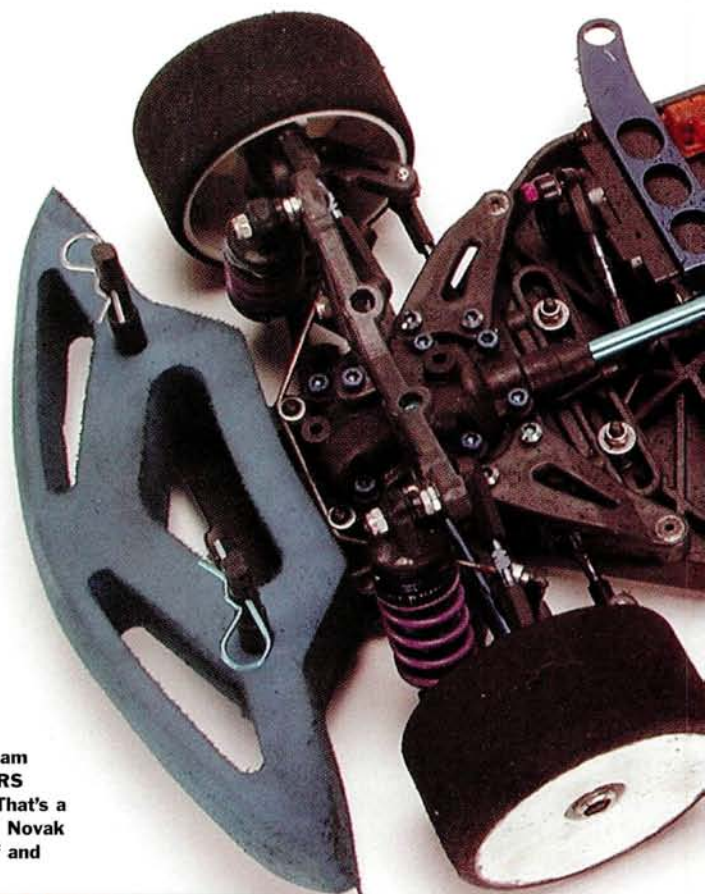
- Factory Team blue aluminum drive shaft
- IRS aluminum diff outdrives
- IRS aluminum servo/transponder mount



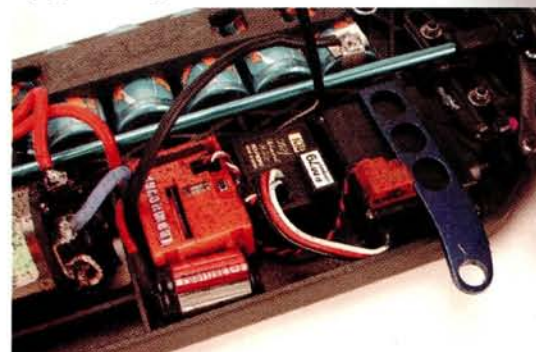
Mike installed zero-degree rear hub carriers from a Team Losi Triple-XS to provide a total of 1.5 degrees of rear toe-in. The IRS aluminum diff outdrives are lighter than the steel outdrives and slightly heavier than plastic—the perfect medium.



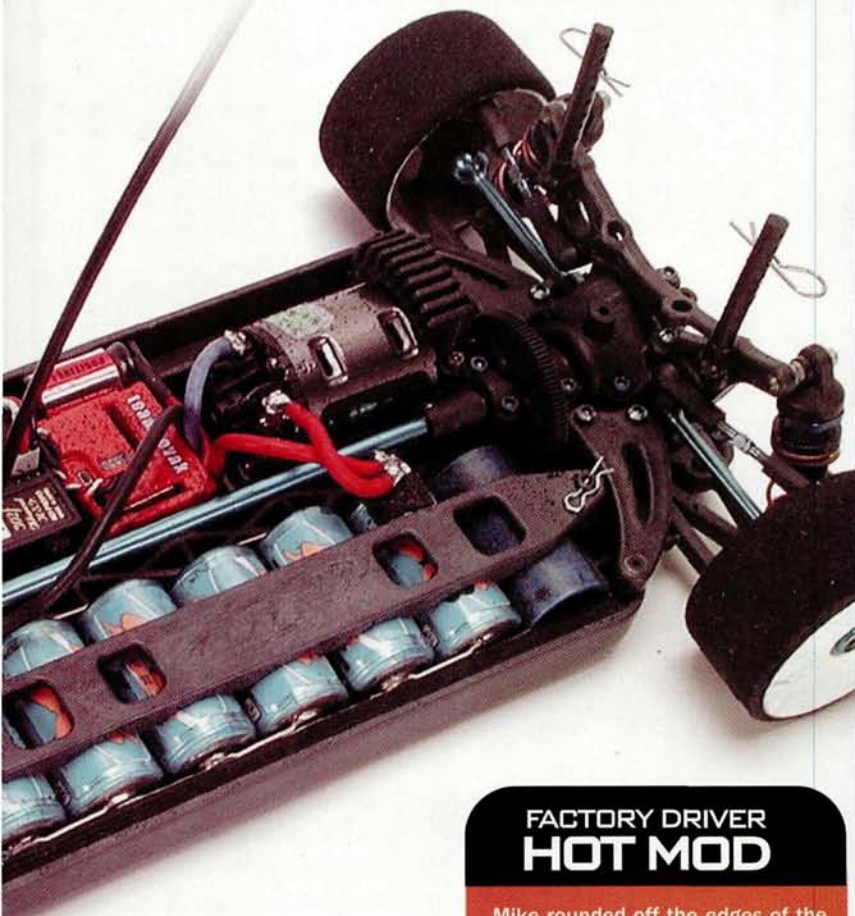
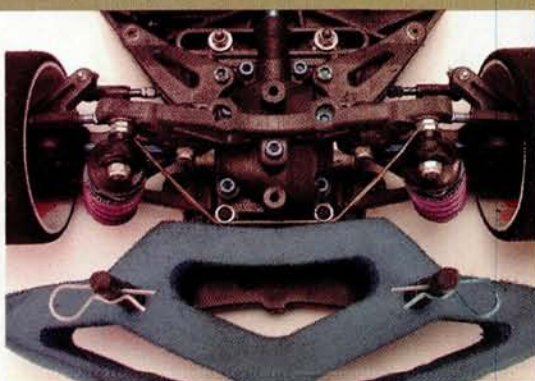
A Reedy KR 8-turn double motor kept Mike's car up front during the entire the race. A dummy cell takes up the extra battery slot in the chassis and keeps the cells in place during a crash. To trim weight, Mike uses the standard TC3 Team Kit motor heat sink instead of the giant blue-anodized Factory Team version.



Mike installed a Factory Team center drive shaft and an IRS servo/transponder mount. That's a prototype Novak GT7 ESC; Novak is always tweaking its stuff and trying new things.



Mike's Factory Team TC3 is pretty much bone-stock except for the IRS aluminum diff outrives, Associated stiff purple springs, 0.055-inch swaybar and modified front bumper. Mike also used a rear shock tower up front to change the front roll center slightly.



FACTORY DRIVER HOT MOD

Mike rounded off the edges of the chassis with a file and sandpaper to provide an ultrasmooth surface that won't get caught in the carpet. Look closely, and you'll notice that the battery slots have been enlarged as well. This is done so the batteries can be mounted closer to the chassis' centerline. It also makes room for the slightly larger GP3300 cells.



SOURCES

IRRGANG RACING SERVICES (IRS)
(609) 476-2371; teamirs.com.

KO PROPO (310) 532-9355;
kopropo.com.

NOVAK ELECTRONICS INC.
(949) 833-8873; teamnovak.com.

PROTOFORM distributed by Pro-Line
(909) 849-9781; pro-lineracing.com.

REEDY distributed by Team Associated
(714) 850-9342; teamassociated.com.

5 QUESTIONS



DRIVER: Mike Blackstock

AGE: 30

LAST BIG WIN: US Indoor Champs Touring Mod class
SPONSORS: Associated, Reedy, Novak, Jaco, Pro-Line, KO Propo, Protoform, BRP, JS-Bodies, Faskolor, Parma, IRS, Kimbrough, Lunsford, Paragon

WHEN I'M NOT RACING: I play Mr. Mom and stay at home watching my son Dominic.

RC CAR ACTION: Congratulations on winning Touring Mod, Mike. At what point did you think that you had a good chance of winning?

MIKE BLACKSTOCK: Well, I hoped that all the practice I did to prepare for the race would get me close. Once practice started, I felt like my car was one of the best ones out there. I knew that if I could drive as well as the car handled, I would be in good shape.

RCCA: Who was your toughest competitor in Touring Mod and why?

MB: That's a tough one. I think everyone in the top 20 was fast this year. It was a matter of executing and finding the right setup. But HPI's Atsushi Hara had me worried a bit after I saw some of the lap times he posted during qualifying.

RCCA: The finish in $\frac{1}{12}$ Mod was controversial because the finish line and transponder loop were in different places. What did you see when Jon Orr and David Spashett came out of the last corner side by side and made a dash for the finish line?

MB: It was absolutely awesome to watch. I know my teammate Jon had a great weekend; I was hoping he would cross the line first. I knew the line was up farther than where the checkered flags were, but it was way too close to tell who actually won. Seems we are having some incredible finishes this year in $\frac{1}{12}$ -scale.

RCCA: What was going through your mind when you saw your wife, Vicky, take the lead in $\frac{1}{12}$ Stock?

MB: I was going crazy watching her during the race. Vicky practiced very hard beforehand, but we had to battle to get her car set up. I knew that if we could just get her comfortable with the car, she would do really well. I was screaming and emotional throughout the race. I think it meant more to me to see her win than my winning the Touring Mod A-main, which took place right after her race. I was emotionally drained after seeing her win, and I will always remember the look on her face when she crossed the line first. I was surprised that I still had the energy to compete in the Main.

RCCA: So, do you think that your son, Dominic, might be a future world champ?

MB: I sure hope so. He already loves RC cars. We have to tie him down when we go to the track, or he would be out there chasing cars. You can bet that he'll have a transmitter in his hand as soon as he's big enough to hold it without dropping it!

by the RC Car Action team

Fuel your passion at the world's greatest RC Expo

Get ready to rock at RCX! On April 24 and 25, 2004, Air Age Media and Vision Entertainment will once again host RCX, the World's Ultimate Radio Control Expo, at the Anaheim Convention Center in Anaheim, CA. The 2003 inaugural event was truly spectacular, attracting tens of thousands of spectators who were blown away by the show's raw energy and power.





click trip
RCX.COM



For tickets, updates
and more action,
visit RCX.com!

ANAHEIM
CONVENTION
CENTER



Sat April 24
11AM - 6PM

Sun April 25
11AM - 6PM



2004
ANAHEIM, CALIFORNIA
APRIL 24 & 25



This year's event promises to be bigger, better and full of even more eye-popping action. We've added more tracks, pulse-pounding demos and head-to-head racing. The boat pond has been enlarged to allow gas-guzzling, deep-vee hulls to churn out wet-and-wild wakes, and there will be two fly zones for back-to-back RC aircraft aerobatics.

In fact, full-throttle excitement will be everywhere you look: nitro-burning, $\frac{1}{8}$ -scale buggies and monster trucks pulling stunts on the freestyle track; RC airplanes and helicopters performing awe-inspiring aerobatic demos; 300-pound robots battling it out in the Steel Conflict cage; and nonstop racing mayhem at the "Try Me" track, where you can take the controls yourself. You can also check out all the hottest RC products at the RCX Shopping Mall and meet face-to-face with major RC manufacturers, retailers and aftermarket companies. Airtronics, Hitec, Hobbico, Hobby People, Horizon Hobby, Kyosho, Novak, OFNA, Pro-Line, Schumacher, Tamiya, Traxxas, Warehouse Hobbies and many others will display their latest gear at RCX. We'll also give away prizes worth thousands of dollars.

So, get ready ... get set ... and go to RCX. It explodes with all the fun, speed and excitement of RC. Tickets are on sale now at rcx.com; log on for all the latest show info! ■



Super-hot import cars and custom trucks will be everywhere. Hop in, or pop the hood. Just don't start the thing, or you'll have security people tapping on the window.

Test your skill on the "Try Me" track and race fender-to-fender against your friends, complete strangers or—if you're lucky—a SoCal hottie.



You can count on a bunch of micro action at Kyosho's Mini-Z track. Kyosho will have a tough time designing a track to top the last one; it was awesome.



You'll be jonesing for a chance to take the wheel at RCX, and Hobby People has the hookup.



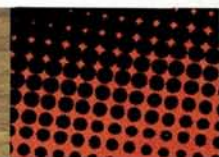
You'll see plenty of hang time at the freestyle track. Good thing the Anaheim Convention Center has high ceilings!



You don't see 300-pound robots battling in a steel cage every day, but you'll see 'em at RCX. These things can do some damage—to each other.



Like what you see? Buy it at the RCX Shopping Mall. You'll be able to purchase RC cars, planes, boats and accessories at deeply discounted prices. This opportunity alone is worth the price of admission.



MAXX

There's been so much new T-Maxx swag piling up on my desk as of late that I figured I would clear it all out and showcase the goods in the latest installment of "Maxx Overdrive."

SWAG!



WILD WHEELS

RDLOGICS ALUMINUM WHEELS

These new zero-degree offset wheels from RD Logics are CNC-machined from forged 6061 T6 aluminum, and they have a cool, wacky-wavy pattern that we just really dig.

Aluminum wheels—item no. 48025 S; \$100/set of 4
RDLogics (626) 810-7797;
rdlogics.com.



GET ON THE WAGON!

TRINITY BEER WAGON

This is not your average, everyday T-Maxx body, now is it? Trinity's new nitro Beer Wagon gives a Lexan shout-out to the old-school, blown '50s, F-style pickup. The body comes complete with a bed decal with kegs and tools. A giant sticker sheet offers all the detail you could want. We especially dig the gun rack decal for the rear window and the "I'd rather be fishin'" bumper sticker.

Beer Wagon—TRI39002; \$32
Trinity Products Inc. (732) 635-1600; teamtrinity.com.



LIVING-DEAD TREAD

TEAM LOSI ZOMBIE-MAX

Losi's new super-sticky Zombie-Max tires are made from their extremely soft red compound for wheel-standing traction on both dirt and asphalt surfaces. The Zombie-Max fits all popular Maxx wheels and is designed for both the front and rear of your T- or E-Maxx. Each set includes special precut, self-damping foam liners for added control and traction.

Zombie-Max—LOSA7670R; \$30/pair
Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639;
teamlosi.com; horizonhobby.com.

MILITARY MIGHT

TITAN TECH ALUMINUM DIFF CASE



Titan Tech has new aluminum diff cases that are especially well suited for use with big-bore conversion kits. The diff cases are machined out of aircraft-quality aluminum alloy and are hard-anodized to military specs.

Aluminum diff case—\$22
Titan Tech (626) 960-0547;
ttracing@aol.com.



BELIEVE THE PIPE

HURRICANE NITRO REAR DUAL-ELEMENT EXHAUST

This new rear-facing, dual-element exhaust for the TRX 2.5 T-Maxx comes complete with header, a dual-canister, silicone coupler, mounting brackets and all the hardware you need to mount it. Best of all, it blows clean exhaust out past and below the bumper so it doesn't get clogged with dirt.

Rear dual-element exhaust—9005; \$55
Hurricane Nitro (480) 976-5053; hurricanenitro.com.



HURRICANE NITRO BILLET RECEIVER CASE

Want to "billetproof" your radio gear? This stout, machined, 6061 billet-aluminum receiver case will surely protect your radio gear in the event of a horrific crash! It comes with all the mounting hardware you'll need, and it fits the original Maxx and the new TRX 2.5. Billet receiver case—9010; \$50 Hurricane Nitro (480) 976-5053; hurricanenitro.com.

SUPER STIFF SPRINGS LUNSFORD RACING



TITANIUM MONSTER SPRINGS

Lunsford's new springs (available in this natural titanium finish only) are ultra-stiff! Lunsford tells us that when they tested the springs, they installed only four springs on a stock truck, and "it

cornered like a champ." On heavier trucks with a ton of billet parts, they installed all eight springs, which helped the suspension react much faster. Lunsford Racing titanium Monster Springs—7605; \$40

Lunsford Racing (541) 928-0587; lunsfordracing.com.

GOLDEN GOODS

GOLDEN HORIZONS TUNED PIPE & ALUMINUM LOWER CHASSIS BRACES

Our buddies at Golden Horizons have some new aluminum lower chassis braces and a sweet little tuned pipe for the TRX 2.5 Maxx. The braces and the pipe are available in silver and blue.

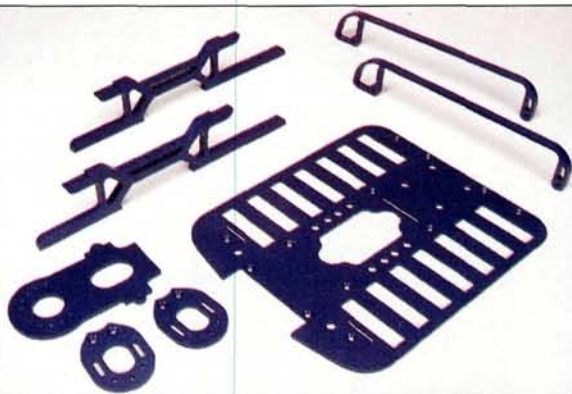
Tuned pipe—08018 (blue)/08019 (silver); \$33
Aluminum lower chassis braces—02204 (blue)/02205 (silver); \$40
Golden Horizons (604) 331-2526; ghobby.com.



VICIOUS VIPERS

RAMTECH-RC VIPER ALUMINUM RIMS

We love these rims. They have a clean-looking design—very simple and not overdone. RAMTech-RC's Viper rims for the Maxx are made from 6061 T6 billet aluminum and are the same stock size with zero offset. They are offered in four finishes: satin, blue, purple and chrome. Viper aluminum wheels—VSrim (satin finish); \$140/set of 4 RAMTech-RC (602) 525-2643; ramtech-rc.com.



GORILLA MAXX RC PARTS E-MAXX ACCESSORIES

If you want to build a cool-ass racing E-Maxx, you need to stop by gorillamaxx.com. They have some of the slickest parts available for the Traxxas' electric monster, and we think

their blue-anodizing is all that! We plan to build a project truck with some of the parts seen here (more on that in a future installment), but for now, we've been messing around with the new chassis-plate set, motor mount, chassis braces and rails. Check with Gorilla Maxx for part numbers and pricing. Gorilla Maxx RC Parts (916) 768-2700; gorillamaxx.com.



STROKER SHOCK

PRO-LINE RACING POWERSTROKE SHOCK SYSTEM

Pro-Line's unique PowerStroke shock system has been turning heads lately! What's unique about the setup is that the unsprung By-Pass shock does all the damping, and it's internally valved to provide progressively firmer damping as the shock reaches its travel limit. The coil-over shock carries a dual-rate spring with a travel limiter and works in unison with the By-Pass to provide smooth damping action. Each corner of your Maxx gets a By-Pass and coil-over shock. The PowerStroke system is also very heavy-duty; it has oversize bodies and 3.5mm shafts.

PowerStroke shock system—6025-00; \$200

By-Pass shocks—6025-01; \$60

Coil-over shocks—6025-02; \$60

Pro-Line (909) 849-9781; pro-lineracing.com.

CRISS-CROSS



RAMTECH-RC IRON CROSS SPINNERS

RAMTech-RC now has Iron Cross spinners for the Maxx that can be used on almost any plastic or aluminum rims. The spinners are made from 6061 T6 aluminum and have high-speed sealed bearings for long life. RAMTech-RC includes axle adapters to fit the spinners on stock wheels, offset wheels and even beadlock rims. The spinners are available in standard or chrome finish.

Iron Cross spinners—SATINICSP (satin)/CHROMEICSP (chrome); \$56/\$76

RAMTech-RC (602) 525-2643; ramtech-rc.com.

LET IT SNOW!

GPM RACING PRODUCTS SNOW PLOW

While it is a true scaled-down snow plow, GPM doesn't recommend that you actually try plowing any snow with it; this is more of a showpiece. You can mount it to your Maxx with the existing bumper brackets, and it comes with two oil-filled adjustable shocks to absorb bumps in the road. The snow plow measures 11 inches wide and 3.5 inches tall.

Snow plow—TMX1901; \$180

GPM; distributed by Hobby Etc. Inc. (603) 595-8549; hobbyetc.com.



maxx mail

I'm 14 years old and have a certain amount of money that I can spend on my T-Maxx (around \$100). I got the truck from my cousin, and it's pretty beat up. It's one of the very first ones—not the 2.5 truck. Right before he gave it to me, he installed a new TRX 2.5 engine in it. I was saving up to buy my own RC truck (which is why I have the \$100), and I'd like to make my T-Maxx look better than it does now. Any suggestions?

Jamie Rupert
Mt. Pocono, PA

Well, Jamie, it sounds as if you're all set in the engine department. If your cousin recently bolted in the TRX 2.5 before he gave it to you, then your T-Maxx should still have plenty of life in it (if it was properly tuned, of course). If all you're looking to do is dress up that "new" Maxx, I'd recommend that you start out with a new set of wheels and tires and then top it off with a new body. I priced some Pro-Line Maxx Masher 2000s, and it shouldn't set you back more than \$80 for a complete set of tires and wheels. A new body costs \$20 to \$25, so that should be right into your price range.

And since we're feeling so generous—actually, Pro-Line is the generous one here—you'll also be getting a new Pro-Line T-Maxx Performance Suspension Kit, courtesy of Pro-Line and "Maxx Overdrive." When you use it on an older Maxx such as yours, the kit makes the truck almost an inch wider, and that makes it considerably more stable. Enjoy your new truck! ■



maxx talk!

Send your "Maxx" questions and comments to maxxoverdrive@airage.com.



body shop

secrets from the paint booth

BY JOSHUA THIEL



Amazing masks

Masking a Lexan body is relatively simple and straightforward; the technique was outlined in the January 2004 "Body Shop" column "Mask Like a Pro." In general, before the paint is applied, a body is covered with a masking material, typically masking tape or liquid, and the design shapes are cut out and painted in the necessary sequence to achieve a specific effect. Theoretically, any design can be created, but the more complex ones can be very slow and tedious to execute. Some graphic effects are simply too complex to be practical for painting, even if you use an airbrush.

When an effect isn't practical to paint using the typical masking methods, it may be time to use unusual masking materials such as store-bought stickers, torn-up paper, sticks from your yard, or anything you can think of that can be used to create a pattern. Finding suitable items is as simple as walking around your house and looking for objects that can be used to paint

a graphic. Items that make good masks are easy to manipulate or modify and can be used repeatedly. I look for something that will create a background pattern or a repeating design that's difficult to duplicate.

Although an endless number of items can be used, I've selected a few pieces and several techniques that you might like to try.



Painters tape or liquid masking works fine for regular masking duties, but oddball items such as string, a paper punch and a modified paintbrush can help you whip out unique masking creations.

Hole patterns

Remember the 7UP cans with the finely spaced dot pattern? Well, that looks cool, but unless you have a pre-cut mask or a vinyl cutter, it's an effect that's nearly impossible to re-create by manually cutting out all those circles—unless you have a hole punch for paper. Paper punches are actually available with more than just circle patterns. Many craft stores sell punches that cut oval, rectangular and even flower-shape holes.

For a dot effect, use a punch to cut a pattern out of paper or masking tape. When I use a paper for dots, I lay them on the body and spray over them lightly. This results in soft-edge circles. For a sharp-edge pattern, use masking tape as a mask. To make the hole punching easier, stick a piece of painters masking tape (its low-adhesion allows it to be lifted off surfaces easily) on wax paper before you punch out the pattern. Peel the punched-out pieces of tape off the wax paper and place them on the body or place the punched-out masking tape on the body. Burnish the edges and then spray on the paint. You can create more advanced designs by alternating a pattern's shape and size and by fading the pattern when you paint.



The dot pattern is laid out on the body and lightly painted over. If the dots aren't made from masking tape, spray very lightly so the airbrush or spray-can output won't blow them away.



Use a hole punch for paper to create dot-shaped masks out of paper and masking tape. The masking tape will be a little more difficult to punch out cleanly, but it has the benefit of adhering to the body.



Above: the fine lines created with the string trick are a lot easier to create and look just as good as those sprayed on by hand.

Right: use string to create complex, overlapping line patterns that would ordinarily be next to impossible to cut by hand. Use a small piece of masking tape to hold the strings in place.



fine lines

Creating a complex pattern of overlapping lines can be a real pain with the typical masking methods and free-hand airbrushing. To solve this problem, I used 1/8-inch-thick string. All I had to do was to cut the number of strands I wanted and then arrange them on the body before airbrushing. It helps to use string that has some "weight" to prevent it from being blown off when the airbrush is used. To avoid disturbing the pattern, apply the paint in very light coats, use very low air pressure, and hold the airbrush farther from the surface. Spraying at an angle perpendicular to the strings also helps.

superfine streaks

Ultrafine lines are nearly impossible to mask out individually. You can create them by painting against a straightedge, but that takes much too long. Instead, use an old or disposable paintbrush as a mask. Thin out the bristles so that a streak pattern will be created when paint is sprayed over it. Just lay the brush against the body and then carefully spray a couple of light coats along the tips of the bristles. You can make different streak patterns by thinning out the brush bristles in a variety of ways.



Above: I used a thinned-out paintbrush to create a fine streak pattern. I held the paintbrush in place with one hand and sprayed paint on lightly with the other. This easy to do, and the effect is easily repeatable.

Right: don't even bother to try to paint lines this fine by hand. Using the thinned-out paintbrush trick makes the impossible possible.



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9174 Kit	\$59.95	\$39.95
4308 Kit	99.95	59.95
4709 Kit	169.95	89.95

IWATA

(Lacquer Friendly)

Revolution HP-BCR	\$100	\$59
Revolution HP-CR	100	59
HP-C Deluxe	210	119

PAASCHE

H Set (SINGLE ACTION)	..\$77	\$42
VL Set	110	59

BADGER

	RETAIL	BEARAIR
Sotar 20/20	\$395	\$129

RICHPEN

	RETAIL	BEARAIR
013G (SINGLE ACTION)	..\$157	\$57
GP-1	328	164

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bodyshop

I bet by now you're looking at your old paintbrush or hole punch differently than before and can think of a bunch of new uses for that bundle of string other than to tie things up. It doesn't really matter what you use; just about anything can serve as a masking agent. Creativity is the key, so go nuts with your next paint job. Just don't get too carried away the next time you look into that bowl of fettuccini. Until next time, have fun and keep painting!

And the winner is ...

Each month, "Radio Control Zone," our online super resource, hosts some sick painting contests. These cyber battles of painting prowess are run by the online members and are strictly in the spirit of fun and sharing knowledge. Hit the Internet at radiocontrolzone.com to check out the rules and enter your creations. Maybe you'll see your best work here in "Body Shop."

This month's featured winner is the work of the team of J-squared. They used Parma Faskolor white, gray and black and mixed up the fluorescent green and purple. Hobbico Liquid Mask was called into service, and the design was completely hand-drawn.



Jason Holt, known online as JDAWG53, works in Research and Design at Hobbico. He is one of two Jasons who make up the J-squared team; Jason Walker is the "other" Jason. They submitted this HPI 200mm Eclipse shell that very deservedly took top honors.

new in the shop

OFNA Racing SNR Pocket Reamer

OFNA Racing's SNR Pocket Reamer is a compact 4 inches with the blade exposed. The three-piece aluminum reamer comes in three finishes: hard-coated, black and polished, and the blade's twin-edged cutting element is replaceable. For creating body-post holes, the SNR Pocket Reamer will cut out a precise, round hole no larger than 1/3 inch. This is perfect, since many body posts are about 1/4 inch in diameter.



OFNA Racing SNR Pocket Reamer—item nos. 38505 (hard-coated), 38506 (black), 38507 (polished); \$25.
OFNA Racing (949) 586-2910; ofna.com.

DETAILING DILEMMA?

Send your Body Shop questions and comments to Josh Thiel at bodyshop@airage.com.



piston power

expert engine advice

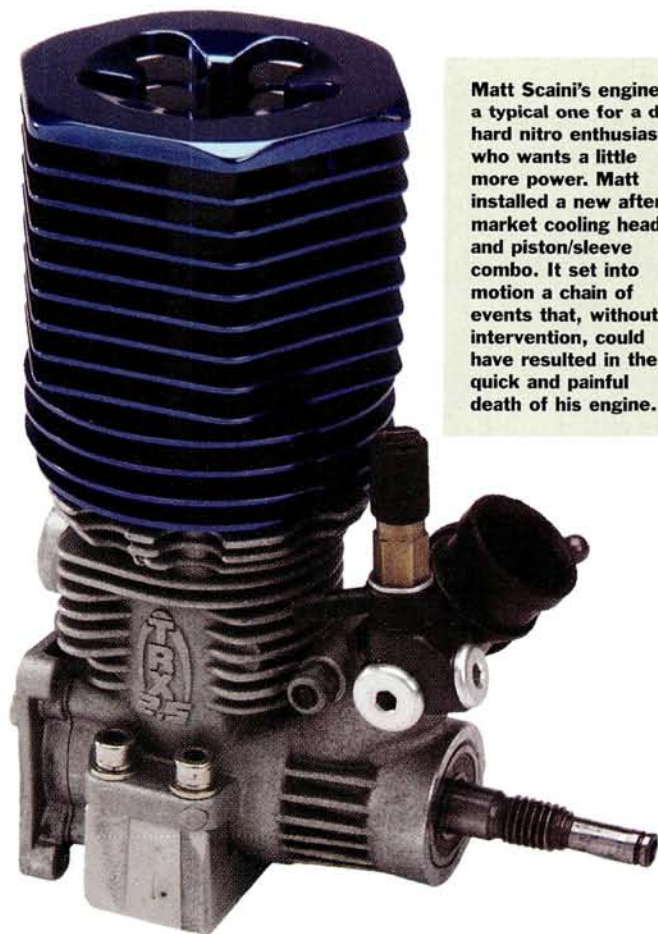
BY STEVE POND

Six ways to kill your engine

Most installments of "Piston Power" are about things that help you get more horsepower, increase engine life, etc. But thanks to an excited and inexperienced reader, this month's column is more about a veritable minefield of things you shouldn't do to your engine—unless you really don't like it.

Matt Saini of Florida sent me an email with questions and concerns about his Traxxas TRX 2.5 engine. Before he contacted me, Matt dived headlong into a rebuild with the hot new parts, and before long, he found himself up you-know-what creek without the knowledge and experience he needed to properly reassemble the engine. Matt didn't know that his project had set into motion a chain of events that could have resulted in a swift and painful death for his TRX engine. When I offered to take a look at his troublesome TRX, I found six important errors we should all avoid.

And here they are, so you won't make the same mistakes!



Matt Scaini's engine is a typical one for a die-hard nitro enthusiast who wants a little more power. Matt installed a new after-market cooling head and piston/sleeve combo. It set into motion a chain of events that, without intervention, could have resulted in the quick and painful death of his engine.

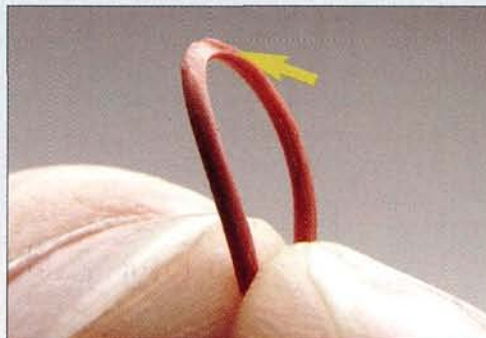
TOO MUCH SILICONE SEALANT

1 SEALING THE BASE OF YOUR CARBURETOR

Isn't a bad idea, but moderation is very key here; too much is far worse than none at all. Excess sealant can easily find its way into the engine where it can foul a bearing or flow in between the piston and sleeve. When we say to use this sealant very sparingly, we mean very sparingly.



Too much silicone sealant is far worse than none at all. Extra sealant can get inside the engine and do untold damage. Less is definitely better here.



Notice the large chunk of O-ring that's missing from the base of the carburetor. This is the result of poorly positioning the carb clinch nut during installation.

CUT CARB O-RING

2 THE STOCK O-RING SEAL AT THE BASE

of the carb had such a big chunk missing from it that extra air easily made its way past, creating a very lean mixture, which can damage the engine. A design quirk of the TRX 2.5 engine causes the O-ring to be damaged if you don't pay close attention to the position of the carb clinch nut when you insert the carb into the engine block. The nut must be centered and then rotated slightly upward so that it protects the O-ring from the sharp lower edge of the carb's bore when you install the carb.

HOMEGROWN PORTING

3 EVERYONE WANTS A LITTLE MORE POWER,

and some are willing to blindly grind away with a Dremel tool to get it. The problem is, unless you know exactly where to grind and what to avoid, you may unknowingly damage the engine so much that it will have to be trashed. Fortunately, the little bit of grinding that Matt did on this crankshaft wasn't in the critical areas that would have negatively affected induction timing, but it was a risky thing to do. It's best not to try this modification unless you have specific instructions from a reliable source.



Above (top): notice the sharp edge of the hole in which the clinch nut is installed. It's easy to see how the O-ring can be damaged when the carb is installed. Above (bottom): center the clinch nut in the opening and rotate it upward slightly. This will help to protect the O-ring from damage.

NO HEAD SHIM

4 THE SHIM OR SHIMS THAT ARE installed by the manufacturer between the cylinder head and the top of the sleeve are essential for setting the necessary clearance between the head and the piston and to seal the head to the sleeve. During his rebuild, Matt removed (or lost) these shims, and didn't know that he had to replace them. At a minimum, the absence of shims will cause a leak at the top of the cylinder because of a poor seal; at worst, it could cause detonation and direct contact of the cylinder head and the piston. This can result in a broken connecting rod and severe pitting of the cylinder head and piston.

When you swap the head or do any maintenance, check for the presence of shims. They are most certainly included by the factory and should always be reinstalled. Aluminum shims are not always easily seen because they may look like part of the cylinder head; there is always at least one shim on every engine.



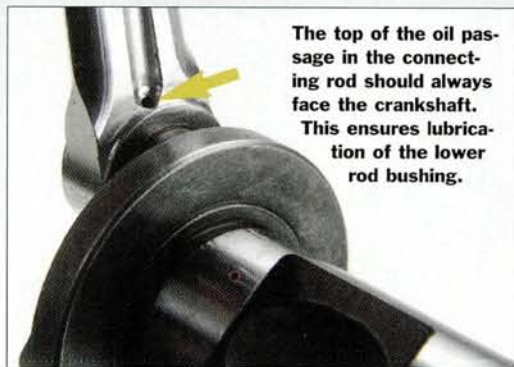
The top crankshaft suffered some random grinding; this will not hurt performance, but it will not help it, either.



At least one head shim is installed on every engine at the factory. The copper-colored shim on the stock TRX 2.5 head has to be transferred to the new cylinder head before it's installed.

CONNECTING ROD INSTALLED BACKWARD

5 MOST CONNECTING RODS HAVE AN OIL HOLE that angles downward from the front of the rod to the center of the lower bushing. Matt reinstalled the piston so that it faced in the proper direction, but he mounted the rod backward: the oil hole faced the back of the engine. The oil hole relies on the flow of the air/fuel from the crankshaft's center port to supply lubricant to the lower rod bushing, but the conrod must be facing the crankshaft for this to happen. Installing the rod backward reduces the amount of lubricant that will reach the rod bushing, and that will cause premature engine failure.



The top of the oil passage in the connecting rod should always face the crankshaft. This ensures lubrication of the lower rod bushing.

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MISSING WRISTPIN CIRCLIPS

6 MOST ENGINES HAVE CIRCLIPS

(circular wire clips) installed in the piston to hold the wristpin in place. The wristpin connects the piston to the top end of the connecting rod. In the process of removing the old piston and installing the new one, Matt lost the circlips, but he installed the assembly in the engine anyway. If the engine had been started



Installation of the circlips that hold the wristpin in place is critically important; it will prevent fatal engine damage.

without the circlips installed, the wristpin would have certainly worked its way out of the piston and then carved a deep groove into one side of the sleeve.

By a lucky twist of fate, the wristpin worked itself into the exhaust port and jammed up the engine so it couldn't be started; that was the problem that led to the engine being sent to our office. Be sure that you install these circlips so they are fully seated, and triple check that they're still in place when you install the piston and rod assembly. There's no quicker way to kiss your engine goodbye than to miss installing these clips.

Matt's near miss gave us a good opportunity to see some of the pitfalls of getting inside your engine without knowing how to put it back together. Pay attention to the orientation of every part as you disassemble the engine. If you're new to nitro engines, take the time to scribble a few notes when you disassemble it; they will make it much easier for you to put all the parts back together. ■



Forgetting to install the circlips in the piston allows the wristpin to move, and that can cause severe damage. In Matt's engine, the wristpin got stuck in the port. Fortunately, this prevented the engine from starting, or there would have been much greater damage.

POWER PROBLEMS?

Send your Piston Power questions and comments to Steve Pond at stevep@airage.com

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4x4

the truck stops here

BY KEVIN HETMANSKI

Metal masterpiece! Yoon ho's Silver Ghost

What's a monster-truck fan to do if he wants a little something special for his next project and all those store-bought chassis' and aftermarket hop-ups just don't have the one-of-a-kind flavor he's looking for? Well, if you're Yoon ho Jo, from Seoul, Korea, you create your own parts to transform a Tamiya Clod Buster into the utterly unique Silver Ghost. To ensure that it didn't look like just any custom truck ('cause you know how many of those there are), he cast his own parts and hand-machined the titanium braces! Check out his work

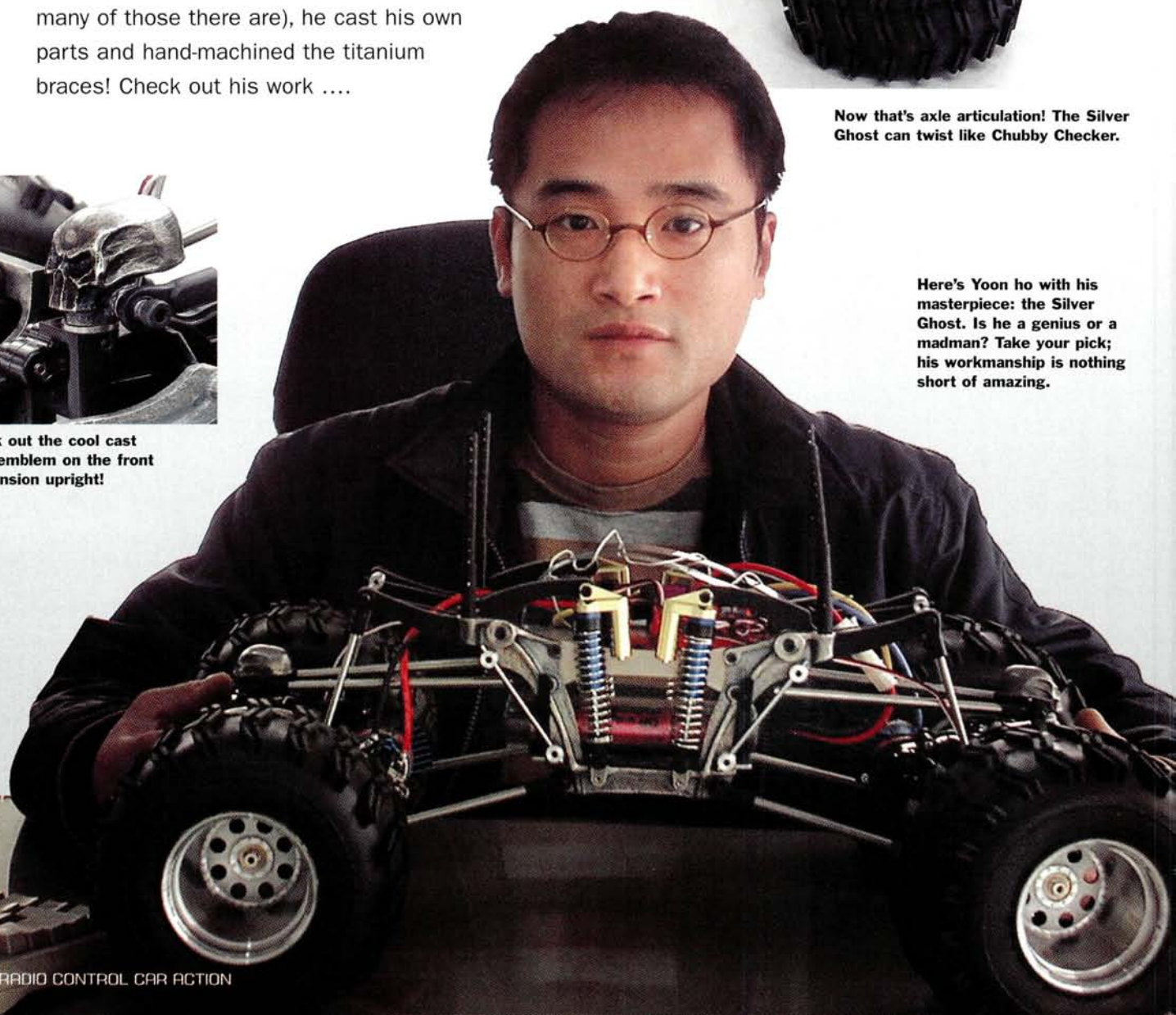


Now that's axle articulation! The Silver Ghost can twist like Chubby Checker.



Check out the cool cast skull emblem on the front suspension upright!

Here's Yoon ho with his masterpiece: the Silver Ghost. Is he a genius or a madman? Take your pick; his workmanship is nothing short of amazing.



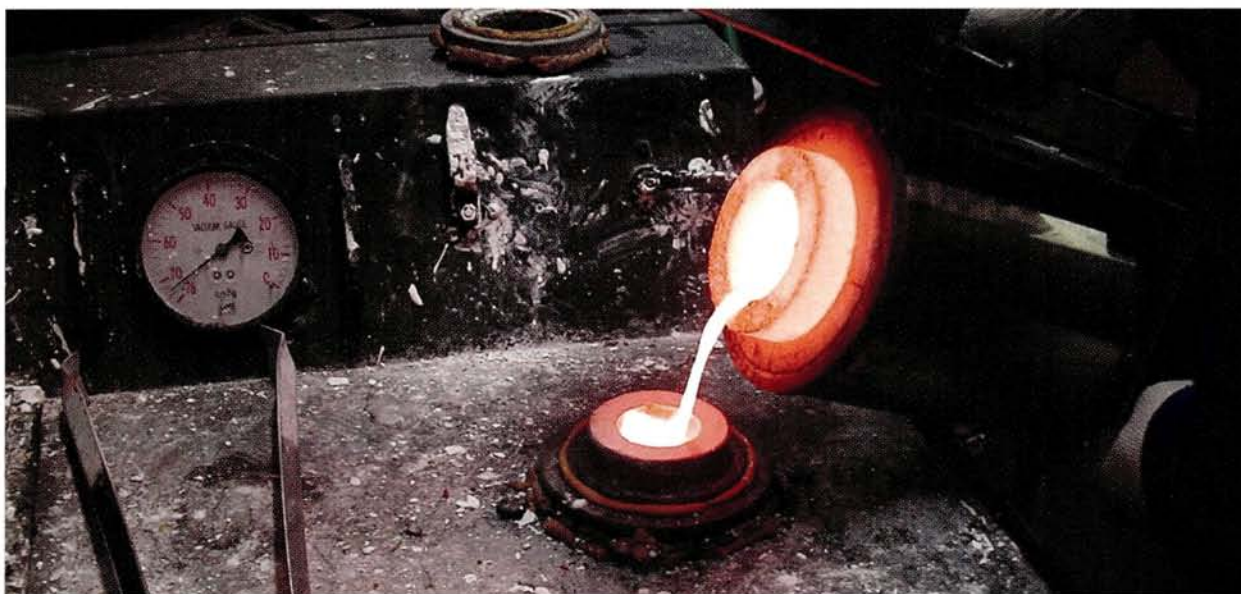
Yoon ho uses the lost-wax method to cast his suspension pieces. First, he crafts wax blanks that are roughly the right size, then, he carves the masters to shape.



The wax masters are ready to be used in the mold-making process.



To create the molds, Yoon ho pours plaster around the masters. When he fires them, the wax melts and the molds are then ready to accept the casting metal.



Time to fill the molds. What! You don't work with molten metal in your workshop?



Some of the parts are just too large to be molded as a single piece, so a little welding is in order.



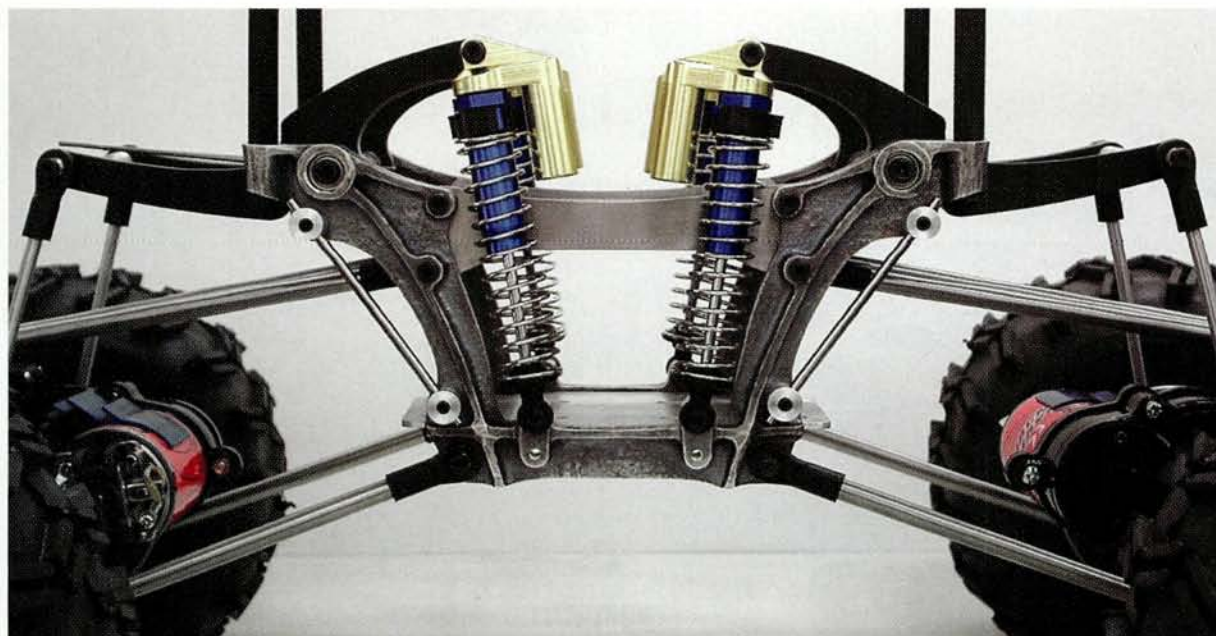
That's real silver in the suspension castings. It isn't exactly the most practical of metals, but it definitely makes the Silver Ghost a priceless work of art. Yoon ho says that the 10-percent copper in the alloy makes the parts strong enough to be suitable for use in a working truck. The alloy may strengthen the pieces, but silver is still prone to corrosion, so Yoon ho gave them a protective potassium-sulfide coating.



Titanium was used for the suspension braces. It isn't quite as precious as silver, but it's infinitely stronger!



Here's the full complement of hand-crafted suspension parts. Ball-bearing-supported nylon cantilevers, machined titanium axles and spring steel stabilizer bars round out the set.



Check out the assembled chassis—talk about a blend of form and function. Yoon ho can be certain no one at the track will have a truck like his—unless he casts a few parts for them! ■

TALK TRUCK!

Send your "4x4" questions and comments to Kevin Hetmanski, kevinh@airage.com.

JR Racing SC-1 forward/reverse speed control

ONE OF THE FIRST UPGRADES many of us make to our vehicles is to swap that clunky mechanical speed controller for a nice, smooth electronic speed controller (ESC). With its SC-1 reversible speed control, JR Racing offers a simple-to-use ESC that's small in size and price but big on performance.

manufacturer's specifications

Operation Proportional forward/reverse with brake
Motor limit 15-turn
Input voltage 7.2 to 8.4 volts (6 or 7 cells)
Peak current 640 amps
Continuous current 160 amps
Full-on resistance: 0.00175 ohm
Frequency 1500Hz
BEC output 6 volts/1 amp max.
Overload protection Thermal
Dimensions 1.5x1.7x0.9 in. (36x43x22 mm)
Weight 1.92 oz.

FEATURES

ONE-BUTTON SETUP. The SC-1 requires only one button to be adjusted to your transmitter. Like many ESCs, the SC-1 requires three presses of this button to set it up: once to set neutral, again for full throttle and a third time for reverse. A flashing LED signals when the throttle should be moved to each setting. The process takes only a matter of seconds, and when it's complete, the SC-1 is set perfectly. The SC-1 doesn't have reverse lockout, but it does require that the throttle return to the neutral position for reverse to engage. This feature is intended to prevent the drive train from being damaged.

INSTALLED WIRES AND PLUGS. Because this ESC was designed with less experienced drivers in mind, it comes completely wired. It includes a Tamiya-style battery plug and bullet motor connectors that make it a drop-in replacement for a mechanical speed control. A universal plug allows the SC-1 to be used with any radio system.

COMPACT SIZE. The SC-1's black case measures just 1.5x1.7x0.9 inches. Its 12-fin heat sink is large enough to help keep things cool, but not so large that it's obtrusive, and that makes the unit easy to install in just about any 1/10-scale car. The power switch is also small, so it's easy to mount out of harm's way.

THERMAL-OVERLOAD PROTECTION. If the SC-1 gets too hot, it shuts off automatically. Once it has cooled to a safe operating temperature, the SC-1 switches itself back on.

HIGH-FREQUENCY OPERATION. With a 1500Hz drive frequency, the SC-1 offers quick forward takeoffs and smooth throttle response in both directions. High-frequency drive also allows more efficient operation, and that, in turn, means cooler running and longer run times.

OTHER FEATURES. The SC-1 can handle 7.2 to 8.4 volts (6- or 7-cell sub-C battery pack) and can take modified motors down to 15 turns. A thorough instruction sheet is included with the SC-1, and JR backs it with a 3-year warranty.



TESTING

After a quick perusal of the instructions, it was time to see whether the SC-1 would be up to the task of an afternoon of backyard bashing. After installing the SC-1 in a Traxxas Rustler, I adjusted it to suit my Futaba 2PCKA. Power came from Orion 2400mAh sport packs, and because the SC-1 can handle mild modifieds, a Trinity 19-turn Caliber provided the propulsion.

The SC-1's high-frequency operation was obvious from the first pull of the trigger; the Rustler shot forward with a vengeance. The throttle response was also very smooth through the entire speed range—no hiccups. The brakes worked flawlessly; the Rustler came to a quick halt. After a quick second tap of up-trigger after I had let the trigger go to neutral, the SC-1's reverse engaged. Reverse was not as quick, but this can be chalked up to the fact that the Caliber's 27 degrees of timing act as negative 27 degrees in reverse.

The fast reaction between reverse and forward made for some slick stunt driving complete with sliding 180-degree turns. Going from reverse to full throttle on high-traction surfaces yielded awesome wheelies.

With just enough downtime to change batteries, I subjected the SC-1 to almost 13 straight minutes of no-mercy run time on a steamy, 80-degree day. If the throttle wasn't mashed, the SC-1 was backing away from trouble or being used to do slides and other stunts. After this punishment, the motor was uncomfortable to the touch, and the battery pack and the SC-1 were hot. Nevertheless, the SC-1 never faltered, and it never got hot enough to activate the thermal-overload protection. For good measure, I put several more packs through the SC-1, and it did everything I asked without hesitating.

THE VERDICT

Although it isn't flashy, the JR SC-1 reversible ESC is a tough customer. It's easy to operate and also sports easy operation and installed plugs that make it perfect for newcomers to the hobby. But because it's a strong performer with a low price tag, anyone who is looking for a reliable reversing ESC should give it consideration. —Nathan Miller

JR Racing SC-1 forward/reverse ESC—item no. JRPSP100; \$65.
 JR Racing; distributed by Horizon Hobby (217) 355-9511;
horizonhobby.com.

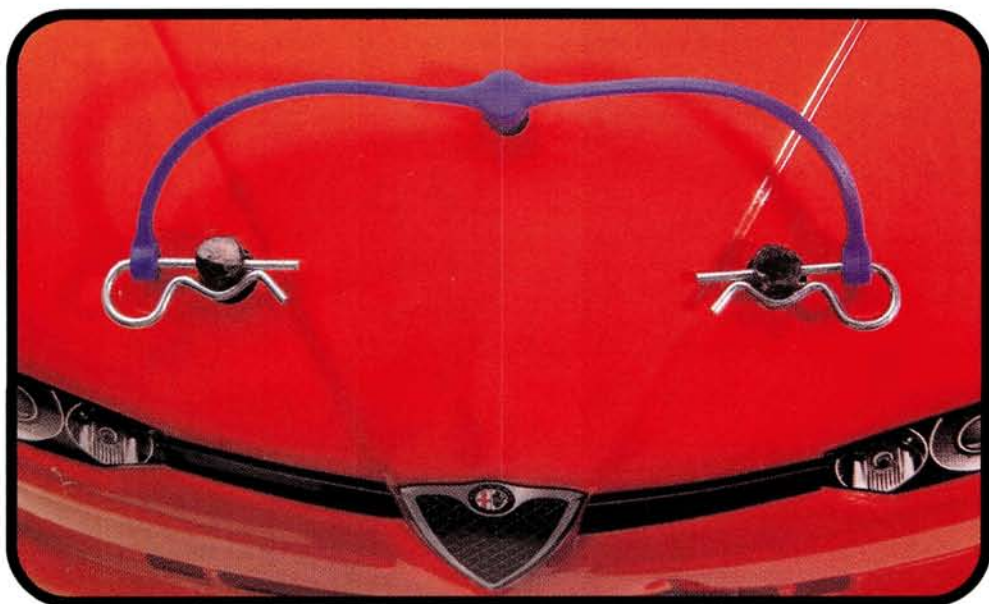
Du-Bro Products Body-Klip Retainer

THE BODY-KLIP RETAINER from Du-Bro may seem a bit silly, but all it takes is one use to discover how handy it can be. Made of molded rubber, the retainer is available in eight colors: black, white, yellow, red, blue, purple, pink and orange. The set also comes with large and small body clips.

The retainer is simple to install: just drill or ream a $\frac{5}{32}$ hole centered between the body mounts, then insert the retainer and attach the body. I found the Body-Klip Retainer most useful when I was out running the car and needed to make a quick adjustment that required me to remove the body. Typically, after I've finished working on a car, the next step is to find the body clips that I dropped. It's frustrating to waste time looking for body clips, and there is always one clip that just disappears. With the Body-Klip Retainer, you won't have this problem again. —Mike Martin

Du-Bro Products Body-Klip Retainer—item no. varies with color; \$4.

Du-Bro Products (800) 848-9411; dubro.com.



SpeedMind Speed Color Wheels

SPEEDMIND'S NEW SPEED COLOR WHEELS are a perfect way to add style to your touring car. The wheels are a blend of SpeedMind's superstrong K-28 Impact Master composites with a special color application technique to create wheels that can handle the rigors of racing and add flair to your car. The wheels have a BBS spoke design and are available in two series: with a chrome or white outer edge with the rest of the wheel colored in your choice of blue, black, red, yellow or full chrome.

I closely inspected the wheels, and the care that went into the manufacturing was obvious. The gluing surface is chrome-free to ensure a

solid bond between the tire and the wheel, and the hub sockets are free of any color for a precise fit. Each color has a brilliant showroom shine, and the SpeedMind logo is painted on the outer edge.

I tested the wheels and found that they hold up very well except for during hard impacts against the boards. These scraped off some of the chrome and paint, but that is common for painted wheels. The paint did not chip off, and the wheels did not crack or break. —Paul Onorato

SpeedMind Speed Color Wheels—item no. varies with color; \$20/set of 4.

SpeedMind; distributed by Magma Intl. Ltd. (905) 886-1808; speedmind.ca.





Team Integy Indi 16X7v6 charger

THE TEAM INTEGY INDI 16X7v6 computerized charger is packed with many features, and it not only offers numerous parameters to adjust for the charging mode, but the discharge and battery-cycling modes can also be highly adjusted to suit your needs. Oh, yeah; it's also an AC/DC-powered unit, so you can use it anywhere.

manufacturer's specifications

INPUT	AC/DC
Charge rate	0.1 to 6.5 amps
Discharge rate	0.1 to 30 amps
Discharge cutoff	0.90 volt per cell
Volt threshold	1mV to 15mV per cell
Cell number	1 to 8
Maximum capacity	6000mAh

FEATURES

AC/DC POWER. The Indi 16X7v6 is designed to operate on AC (household current) or DC (a 12V car battery). This makes the charger very versatile, and you won't need to lug a power supply around with you.

LCD SCREEN. The screen is easy to read, and two lines give sufficient display detail, so the info presented doesn't send you running to find the manual to decode stuff.

DETACHABLE AC AND DC POWER CORDS. Some AC/DC-powered chargers have a bunch of wires coming out for the various hookups. The 16X7v6 allows you to clean up your space because the input cords are removable—simple, but a very nice feature.

THREE MODES OF OPERATION. The 16X7v6 is a full-function charger: it charges, discharges and cycles battery packs.

MULTIPLE-PARAMETER PROGRAMMABILITY. Many of the variables of charging, discharging and cycling—such as charge and discharge rates—can be adjusted. You can also adjust the voltage threshold for peak detection and the number of cells in the pack. You can set it for the number of cells you're charging, and you can also program it to suit a pack's rated capacity, e.g., 2400mAh, 3000mAh, 3300mAh, etc.

TESTING

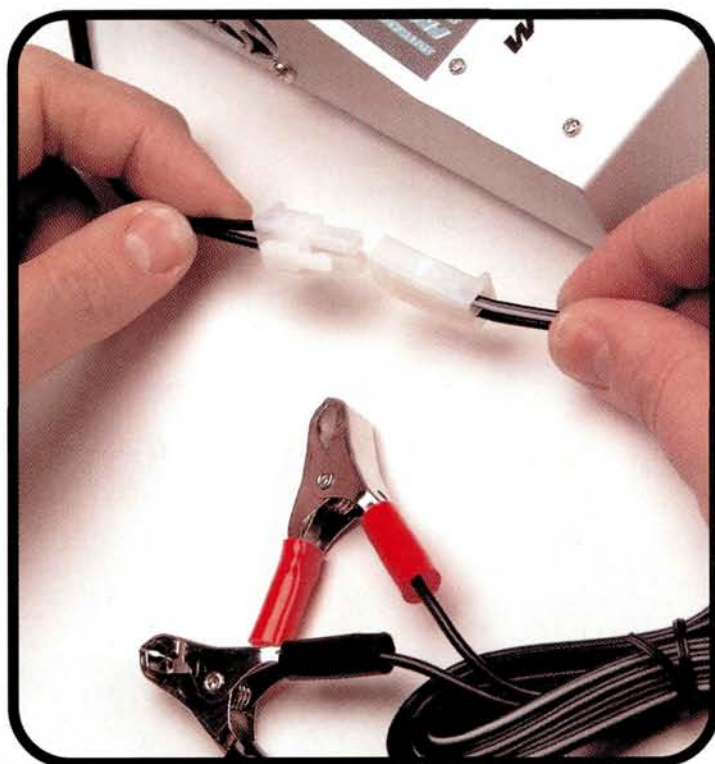
I tested the 16X7v6 on NiMH racing packs, Ni-Cd and NiMH sport-level stick packs and old and very stubborn 2400mAh Ni-Cd packs. I was confident that it wouldn't have any problem with the newer packs, but I really wanted to see what it would do with the old packs that routinely false peak and are duds for punch when they do take a charge; they would serve as a true test for any charger.

After I had run through the menus once, the 16X7v6 became very simple to use. Its straightforward design didn't give me any surprises. I didn't have any problem setting it up to charge my packs. I liked that I could set it for the type and number of cells I was using and could program in the rated capacity. My only complaint is that the 16X7v6 is loud; its fan and beep tone are louder than on any other charger I've owned.

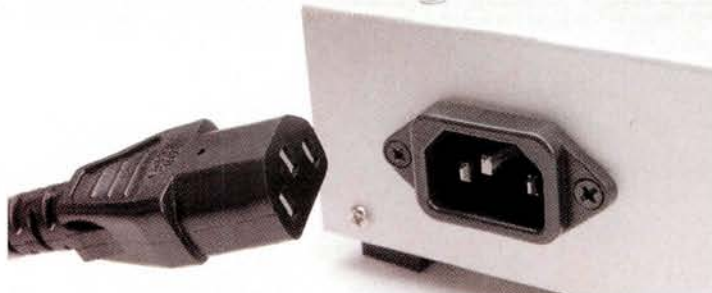


The two-line LCD screen is backlit, and each line can display 16 characters—enough space to avoid using cryptic abbreviations; this makes the 16X7v6 very easy to use.

As I expected, the 16X7v6 put a full charge into the new packs without any false peaking. The charged packs were race-run, and the results were excellent. Punch and run times were as good as (or better) than those of anything else on the track. Charging my older Ni-Cd packs also proved to be a non-issue; when necessary, I raised the voltage-threshold setting slightly and got a full charge without having to hit the start button more than once.



For a 12V DC power input, you can attach the alligator clips. The lead used here has the standard, easy-to-find, Tamiya-style plug. The detachable power cords are great; they clean up your work space and cut down on how much you have to lug around.



The removable AC power cord is the standard type that's used for computer applications. That means different lengths and replacement cords are easy to find at any office-supply store.

OPERATION

As RC electronics offer more features, they inevitably become more complicated to use. Although some are certainly easier to navigate than others, most of these "computerized" gadgets will evoke a "Huh?" when you first use them, and this is certainly true if you neglect to take a gander at the instructions. On first look, the 16X7v6 definitely seems to be more complex than it actually is. To start charging, first select the mode (charge, discharge, cycle) using the "Dec" and "Inc" buttons. After that, hit "Enter" to start, or press "Back/Setup" to toggle through and change any of the parameters for the mode you've chosen.

THE VERDICT

The Indi 16V7v6 shows that chargers with complicated features don't have to be difficult to use. The 16X7v6 is loaded, and although other chargers have more features, they aren't in this price range and none are AC/DC-powered. The Integy 16X7v6 is a great value; it works well and is very suitable for sport running and racing. —Matt Higgins

Team Integy Indi 16X7v6 charger—INT E2025; \$200.

Team Integy; integy.com. ■

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just add missiles

We don't do a lot with flying machines here in the "Backlot," but this turbine-powered chopper was too cool to pass up. That's a real jet engine under the canopy! Now, all it needs is a paint job and some missiles. Or a Gatling gun. Actually, it needs both.



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LEAGUE OF EXTRAORDINARY RC

If you rent "League of Extraordinary Gentlemen," be sure to check out the bonus disc. Captain Nemo's car was often a computer-generated effect, but a lot of the action was shot on a miniature set with an RC version of the Jules Verne-inspired car. Actually, "miniature" might not be the best word—the model is huge! See the bonus disc for an inside look at the construction of a truly unique RC machine.

ARE YOU HARDCORE?

Back in the January '04 issue, we challenged you to prove that you're a hardcore RC fan by ID'ing a few old cars and answering a few Qs. One winner was to be picked at random from all the correct entries, and that winner is John Matrishon, from South Deerfield, MA. Here are the answers, for those of you who aren't quite as hardcore as John:

1. Name this car and the company that brought it to the States.

That's an AYK Radiant (bonus points if you noticed it had the mid-motor conversion). The importer was Race Prep.

2. Name this 4WD buggy. Bonus: which other RC product did RC Car Action cover from the same company?

Tomy briefly entered the "serious RC" market in '93 with the Intruder EX. And which other Tomy product did RC Car Action cover in '93? This guy—an RC robot that looks a lot like RoboCop's ED 209.

3. Name all the variations of the Tamiya Manta Ray

Not many of you were able to name all the Manta Ray variations, which is just as well, since the complete list is way too long to print here. The short list includes: the Terra Conqueror, Blazing Star, Dirt Thrasher, Top Force, M1025 Hummer, Chevy S-10/Toyota PreRunner/Ford F150 Baja trucks, TA01/TA02 sedans

4. Who painted this car?

Joshua Thiel, our "Body Shop" guy, threw the paint for Steve's 100mph HPI Super Nitro RS4 project car.

THE PRIZE

For his complete command of RC trivia, John snags himself an Associated B4 RTR! Good work, John, and special thanks to Team Associated for the B4 hookup.

